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Original Contributions.

ARTICLE XVI.

A NEW THEORY OF THE ORIGIN OF "DUMB-BELL"  
CRYSTALS.

By D. W. FLORA, M.D., Chicago, Ill.

It is proposed to open the discussion, by giving the history of a case which fell under my treatment, about one year ago, in which the urine of the patient contained abundance of the crystals in question, in common with the oxalates of lime.

The observations made in this case from day to day, led me to doubt the existence of the "dumb-bell" as a primary form of crystallization, and to ascribe its occasional appearance to mere accident depending upon changes produced by the accidental union of other crystals.

CASE OF DYSPEPSIA WITH OXALURIA.

S. C., *æt.* 32 years, a private of Co. F., 13th Mich. Volunteer Infantry, was admitted to Madison U.S. General Hospital Dec. 1st, 1864. On admission, the patient appeared somewhat cachectic, and had dyspeptic symptoms, with obstinate constipation. *R.* Pil. cath. comp., No. iij., to be followed by Seidlitz pulv. every hour, till bowels move. To keep the bowels in a soluble state, fl. ext. rhei,  $\mathfrak{z}$ j. was ordered daily.

*Dec. 12th.*—Patient seized with a tertian ague, which readily

yielded to sul. quinine. An ulcer on the left leg, over the spine of the tibia, was noticed about this time to be in an indolent condition. This ulcer occupied the site of a previous bruise.

*Dec. 19th.*—Constipation still continues, and the ulcer inclines to spread. The spittoon by the patient's bed was observed to be filled with rejected food after meals, which the patient stated was thrown from the stomach immediately after being swallowed. He was taxed with voluntary vomiting, which he stoutly denied.

*Jan. 20th, 1865.*—The vomiting still continues. He was put upon raw beefsteak, cut into fine cubes,  $\mathfrak{z}$ ij. daily. No fluids allowed. *Jan. 30th.*—No change. Smoked ham was then substituted for the raw beef, but with no better results. *Feb. 1st.*—About this time, the patient complained of pain and tenderness in the renal region, with frequent desire to micturate. The urine was rather abundant, of a deep straw color, or light gamboge. The reaction was slightly acid—sp. gr. 1022. On cooling, a dense precipitate was formed, equal to one-fourth the whole bulk. This cleared up under the influence of heat, and also readily on the addition of nitric acid. A drop placed upon a glass slide, and allowed to crystallize spontaneously, presented the appearance seen below. The *urates* were undoubtedly present, as were also deposits of epithelium and uriferous casts. The octohedral crystals of oxalate of lime were seen in myriads, many of them exceedingly minute.—Stellate crystals, composed of numerous fine prisms arranged around a common centre, were also numerous, as may be seen by reference to the drawing.

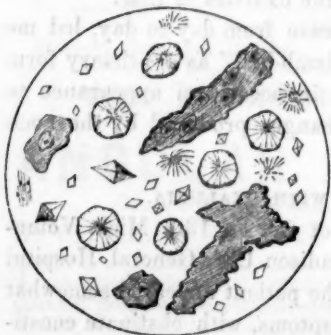


Fig. 1. Appearance on first Examination.

A large cruciform crystal was occasionally to be seen in the field. "*Dumb-bells*" were sought for in vain! The stellate crystals were undoubtedly *urates*,

but whether of ammonia, soda, or potash, I was, at the time, unable to make out.

These stellates are the crystals which are hereafter to figure as "dumb-bells." This first specimen was carefully set aside, still under the field of the microscope, and twenty-four hours afterwards a *second* examination was made, when the stellate crystals, composed of the urates, showed a tendency to unite by solution or liquefaction of a portion of their discs. This is the *first step* in the formation of "dumb-bells," and it requires only a slight modification to complete the metamorphosis. By the pressure of fluids (for at this time rapid deliquescence of the crystals is taking place) upon the outside of the now united discs, the rim is forced inward upon itself at the point of least resistance, to wit:—at the point of junction of the two discs the radii being already dissolved at their points of contact. The prisms which formed the radii of the circles are now set afloat, and arrange themselves parallel to each other and in the direction of the long diameter of the "dumb-bell."

When examined again, say 30 hours after the first, the long-sought "dumb-bell" was discovered in the same field which had been twice explored unsuccessfully. [See Fig. 2.]



Fig. 2. Appearance on third Examination.

Such, in brief, is the history of the case which led to a series of investigations, and the adoption of the theory of "dumb-bells," which it is the object of this paper to elucidate. It may be added, that this man was discharged from

the service of the Government four months after admission, no improvement having been observed in his condition. Before leaving the hospital, he boasted to his nurse that he "had played his game successfully, as his vomiting had all been produced voluntarily." If his admission be true, it is a remarkable case, exhibiting all the aggravated symptoms of *dyspepsia*

as cachexia, oxaluria, etc., brought upon himself and maintained during a period of four months, by persistent voluntary rejection of his food.

I shall take the liberty to refer to a case now under treatment, in which the urine is acid when first examined, and contains the *urates*, as well as the *oxalates*, in great abundance. The deposits have been more thoroughly and carefully examined than in the preceding case, and have given almost precisely similar results. On the fourth or fifth day, a final examination was made, the results of which very nearly resembled the appearance figured in Dr. GOLDING BIRD'S work on Urinary Deposits, in which he intends to represent one phase of the "dumb-bell" crystals. The forms referred to appeared at a time, and under circumstances, which leave no doubt on my mind that they are the last which these crystals (dumb-bells) take, previous to their entire liquefaction.

Although it is not incumbent on me to prove the exact composition of these crystals in question, in order to sustain my theory, yet a brief resumé of the opinions of some prominent authors on this subject may not be out of place.

GOLDING BIRD says:—"It is well known that all crystals, referable to the cube or regular octohedron, never possess double refraction, and, hence, scarcely exert any influence upon a plain polarized ray of light. In accordance with this law, the ordinary crystals of oxalate of lime do not, in the slightest degree, exhibit the phenomena of color when examined in the polarizing microscope, merely in the slightest degree, if applied in a favorable position, appearing to be illuminated when the polarizing prisms are crossed. On the other hand, the dumb-bells, as I long ago stated, exhibit a beautiful series of colored rings traversed by a black cross." After detailing several experiments with these dumb-bells, he says:—"We may safely conclude that they do not consist of mere oxalate of lime, for their powerful action on polarized light is quite incompatible with their being composed exclusively of this salt. The action of heat shows that they are readily converted into carbonate of lime without change of form." In conclusion, the same author

says:—“I think we may venture to assume the high probability of these crystals (dumb-bells) consisting of the oxalurate of lime.”

Dr. HASSALL, in the *British and Foreign Medico-Chirurgical Review*, remarks:—“That soluble dumb-bells in the urine frequently consist of sulphuric acid in combination with soda or potash.”

Dr. OTTO FUNKE, in his beautiful micographic work on urinary deposits, has figured and described these crystals as composed of the urates of soda.

Dr. BACON, in the *American Journal of Medical Sciences*, for April, 1851, is inclined to regard the oval crystals shown in my last drawing, as “dumb-bells seen endwise.” He dissolved them in strong acetic acid, and on spontaneous evaporation they presented abundance of zeolitic crystals, from “*circular striated plates to dumb-bells.*”

This experiment strengthens the position taken in this essay, for unless this “zeolitic arrangement” is present, unless we have the “circular striated crystals,” we cannot have dumb-bells!

In regard to the ultimate composition of the dumb-bell, my friend F. MAHLA, Professor of Chemistry in Chicago Medical College, has long held that they are *not* oxalate of lime, and he is further inclined to refuse them a place among *primary* crystalline forms. These crystals have never been observed by me in any other than *acid* urine, in which *urates* were undeniably present.

If the theory here advocated be correct, it is impossible for them to appear in *alkaline* urine, and this is verified in the case which we now have under examination. As soon as the urine became alkaline, by the evolution of ammonia, (the octohedral crystals of oxalate of lime being still present,) the “dumb-bells” disappeared altogether, and were replaced by a copious deposit of the *triple phosphates*.

There are six different geometrical forms to which *all* crystals may be referred, and it would require a great stretch of the imagination to perceive any similarity in the “dumb-bell” to *any* of these forms or their modifications.

The "circular or stellate" crystals, which we regard as the originators of the "dumb-bell," are themselves *secondary* forms, the result of an arrangement of needle-shaped prisms around a common centre. From whence it follows that our famous "dumb-bell," about whose composition there has been so much discussion, and such wide differences of opinion, is only an *accidental* and *tertiary* form, the result of *accident* merely!

*Cottage Grove Avenue.*

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ARTICLE XVI.

PRACTICAL REMARKS ON BLOOD-LETTING.

By D. B. TRIMBLE, M.D., Chicago, Ill.

IN continuation of the subject of the application of blood-letting in the treatment of diseases, I propose, next, to take up those affecting the circulatory system.

In this class will be enumerated the diseases of the heart and its membranes; those of the arteries, and veins; and those of the blood: to which this treatment is applicable.

1ST. DISEASES OF THE HEART.

In the inflammatory affections of the heart, blood-letting, both general and local, is frequently required: and the different phlegmasiæ affecting this organ being very frequently combined, and the treatment that is applicable to one, to some extent, being applicable to all, it may be supposed that they should be considered under one head; but as they do, frequently, occur separately, and often arise from different causes, it is safer to state the treatment of each disease separately.

*Pericarditis.*—On the Etiology of this disease, in a very great degree, depends the propriety or impropriety of bleeding. If an idio-pathic affection (which is very rarely the case), free venesection will generally give prompt relief, and if followed by other proper remedial measures, including, if necessary, leeching, a speedy and perfect cure may be reasonably expected. If

of rheumatic origin, prompt and free venesection is also demanded. This may be the more freely resorted to, if the pericarditis occurs simultaneously with the rheumatism, than if appearing after the patient had been previously affected. Venesection is the better borne in the cases arising from this cause, as the patients are generally young and robust. But even when of rheumatic origin, this remedy should not be too freely resorted to, for, as Dr. WALSHE, in his treatise on Diseases of the Heart, says—"Bleeding from the arm cannot be pushed to any notable extent, without the risk of inducing syncope—an occurrence of serious danger when already the heart's vigor is dynamically and statically impaired." "Very copious depletion, particularly in some constitutions, excites the heart greatly;" but yet he says "Moderate venesection shortens the duration of pericarditis, and does so more effectually the earlier it is employed." He recommends the abstraction of eight to twelve ounces in this way, and "if well supported, followed by the abstraction of six or eight ounces more, by cupping or leeching over the heart." Professor FLINT, in his work on the same subject, says that a person in "fair health," affected with pericarditis from either of the above mentioned causes, is a proper subject for blood-letting at the commencement of the disease. The immediate effects of bleeding are, relief to the pain and dyspnœa, and diminished force and less irregularity of the heart's action: the ultimate effects, if successful, the prevention of effusion into, and adhesion of, the pericardium, and restoration to health. But a large number of cases of pericarditis arise from other causes, and generally of a debilitating character, which contra-indicate the use of blood-letting in many cases, and should induce more caution in all. Among these causes may be enumerated prostration from previous disease, intemperance, anæmia, and alburnimuria. The last mentioned is a frequent cause of pericarditis, and as it occurs generally in those advanced in life, bleeding should be dispensed with. Where effusion has taken place, it is also useless and improper to bleed. In chronic pericarditis, where a congested condition of the pericardium exists, local depletion by leeching,

or cupping the left thoracic region, may be required, but in the majority of cases it is not necessary.

In *Endo-carditis*, bleeding is as necessary as in the preceding disease, and there is less caution necessary in its application, as there is not the danger of debility, or paralysis of the heart, from too much depletion, that there is in pericarditis. In endo-carditis we must not expect to find the severe pain in the left thoracic region that is symptomatic of pericarditis, for in this disease the pain is more obtuse, and frequently absent. On the other hand, the pulse, in the early stage, is even more frequent than in pericarditis, though failing more early. Congestion of the lungs, brain, &c., often occur in the course of the disease, calling for prompt and active treatment to obviate them. The same conditions of the system, and the same causes, as in pericarditis, modify and govern the treatment, in the same way, in endo-carditis.

In *Endo-Pericarditis*, the same treatment is required as in the preceding cases.

*Carditis*, or *Myo-carditis*, as an idio-pathic affection, is a very rare disease. It is almost always associated with inflammation of either its lining or investing membrane, or with both, and its symptoms are very obscure. Its treatment is almost identical. In bleeding, in these cardiac inflammations, we should have a reference, not only to the preservation of life, and restoration to health, but also to the prevention of their sequelæ; as abscesses, softening, induration, and aneurismal dilatation in myo-carditis; chronic valvular disease in endo-carditis; effusion and adhesion in pericarditis; hypertrophy in each, &c.

*Hypertrophy* of the heart, being a chronic disease, produced by other diseases, especially of the heart, bloodvessels, or blood; or by injurious habits of business or indulgence, does not require the free depletion that is necessary in the active cardiac inflammations. It is generally, though not always, associated with dilatation, and where the latter condition predominates, bleeding must be very cautiously, if at all, used. But in simple hypertrophy, or where this is in excess of the dilatation, especially if consequent upon inflammation of the heart, or its

membranes, plethora, rheumatism, or chronic valvular disease, then moderate venesection, repeated at intervals of a few weeks, and accompanied or followed by the use of cups or leeches, would greatly aid in the cure of the disease. When the blood is in an anæmic condition, it would be improper to adopt this practice. WALSHE prefers cupping or leeching over the præcordial region, to general bleeding; but FLINT advises general blood-letting, "when there exists over-repletion of the general vascular system, the object being, by lessening the mass of blood, to facilitate its circulation." The existence of plethora furnishes the indication for blood-letting, and the removal of this state constitutes the limit to which it may with propriety be carried. Carried beyond this limit, the detraction of blood can hardly fail to be pernicious." Injudiciously practised, blood-letting is injurious in proportion as it impoverishes the blood, and weakens the muscular power of the heart."

*Chronic Valvular Diseases of the Heart* are generally so far advanced before medical aid is called, that their cure is almost hopeless; but we can do much to retard their course. Their tendency is to produce hypertrophy and dilatation (as well as calcareous, cartilaginous, and other morbid deposits, in the valves), which greatly enhance their danger, and it is very desirable to obviate, or retard this effect. If, when this is the case, there is a plethoric condition of the system, with a flushed face, and full pulse, and the red globules of the blood in excess, moderate and occasionally repeated venesection, followed, if requisite, by local bleeding, will often give temporary relief, but should never be resorted to after the occurrence of dilatation. Some years ago I attended a lady with a valvular affection, of long standing, who, for months before her death, was unable to take the least exercise without producing severe dyspnoea; and the effort of walking across her room, at length induced her death. The condition of the heart, revealed by the *post mortem* examination, caused surprise that life should have been so long maintained. There was a large calcareous deposit in the aortic and semilunar valves, converting them into a substance like stone, and to a less degree, in the mitral valve.

In the *Functional Affections of the Heart*, though bleeding is not so necessary as in the preceding classes of disease, yet it will be occasionally required.

*Palpitation*, depending on a variety of causes, must receive various treatment; but if caused by plethora, and where the pulse is full and strong, bleeding is beneficial; or if produced by spinal irritation, cups or leeches, applied to the tender portions of the spine, will be found to aid in relieving it.

In *Angina Pectoris*, during the paroxysm, if the system is plethoric, and the pulse strong, blood may be taken freely from the arm, but this is not often required. In connection with this, or alone, local bleeding may be resorted to. WALSHE remarks—"If the patient be the subject of undoubted sthenic plethora, and especially if the heart be known, by previous examinations, to be a well-nourished one, the abstraction of blood from a vein, or cupping between the shoulder blades, is clearly indicated; but bleeding must not be needlessly undertaken, and without assurance as positive as attainable, that the heart is, at least, not a dilated, soft, or flabby one." In all cases attended by debility, a pale skin, or anæmia, it would be injurious.

## 2D. THE BLOODVESSELS.

In *Asteritis*, where the usual symptoms of inflammation are present, free venesection, followed by leeching along the course of the inflamed vessel, will, in most cases be demanded.

In *Aneurisms*, where there is a rich condition of the blood, with a strong, full pulse, and a plethoric habit, and especially if there is inflammation of any of the thoracic or abdominal viscera, venesection may be practised moderately, with a view of lessening the volume and momentum of the blood, thus relieving the distension of the diseased vessel, and giving it an opportunity to contract. If the phlegmasiæ of the thorax or abdomen attend the aneurism, local bleeding is often necessary. Though free and repeated venesection was advocated by writers on the subject, fifty or more years ago, yet later, and prominent authors, as STOKES, WALSHE, FLINT, &c., confine themselves to one or two moderate bleedings in any case, and in the majority of cases, dispense with it altogether.

In *Arterial Palpitation*, depending upon congestion, or irritation of the spine, or solar plexus, accompanied with a full and excited pulse, venesection may be employed, though generally not necessary. Cups or leeches applied to the spine, or in case of palpitation of the abdominal aorta, leeches to the epigastrium are more frequently required.

In the early stages of *Phlebitis*, venesection is occasionally beneficial, especially where the pulse is full and frequent. Leeches along the course of the inflamed veins should be freely applied, and repeated should the inflammatory symptoms continue. In *crural Phlebitis*, or *Phlegmasia Dolens*, they should be applied along the course of the femoral vein. They may also be applied over *varicose veins*, where inflammation exists.

3d. In some of the diseases of the *Blood*, bleeding is strongly indicated; in others, it is wholly inapplicable.

In *Plethora*, where it is only temporary, it is not generally necessary to bleed; but if active, or threatening congestion of the brain or lungs, it should be freely employed.

*Purpura*, arising from opposite conditions of the system, requires different modes of treatment, depending on the cause of the disease. In some cases, as far as my observation goes, almost always, it arises from inefficient sanguification, and causes which debilitate. In cases of this nature, depletion would be highly improper; but it sometimes occurs in the robust and vigorous, and when this is the case, accompanied by a full, strong pulse, especially if there should be inflammatory congestion of the abdominal or thoracic viscera existing at the same time we may resort to venesection. It has been known to occur in suppressed menstruation, and in these cases, also, it would probably be beneficial to deplete.

Where the *Blood* and *Bloodvessels* are conjointly diseased, as in *hemorrhage*, it is frequently required. If, in hemorrhage, the pulse is full and strong, and there is fever; or if the patient is predisposed to plethora, venesection may be more or less freely practised. A large orifice should be made, so as to make a sudden impression, which will frequently check the hemorrhage. Where the hemorrhage is of a passive character, bleed

ing is inadmissible. A few years ago, I was called in consultation to the case of a middle-aged lady, who had been bleeding freely for several hours from the nose, and over which all the remedies used appeared to have no control. She was also suffering with severe headache, and her pulse was moderately full and strong. With the assent of the physician attending her, I opened a vein in the arm, and bled her freely. A moment after we had examined her pulse, and found it still in good condition, she fainted, and it was a long time before she rallied; but the headache had disappeared, and there was no return of the *Epistaxis*.

In *Hæmoptysis*, the causes are so numerous and various, that no definite treatment can be recommended as applicable to all cases. When proceeding from pulmonary inflammations, from congestion or apoplexy of the lungs, from organic disease of the heart, from aneurism, from the suppression of habitual discharges (as the menses, &c.), from a morbid state of the blood, either in quality or quantity, from pregnancy, and occasionally from phthisis, bleeding is indicated, and may be repeated until the hemorrhage is checked, and the morbid excitement alleviated. When the pulse is full and strong, the system plethoric, and any of the above mentioned causes, except phthisis, producing it, we may use considerable latitude in resorting to the remedy; but if we have cause to suspect the existence of tubercles in the lungs, or a predisposition to them, we should be more guarded in our practice; and, if deemed necessary, use it moderately. If inflammatory irritation of the lungs should continue after venesection, or the subsidence of the hemorrhage, cups or leeches should be applied to the thorax. By lessening the quantity of blood by venesection, we relieve the bloodvessels of over-distension, moderate the force of the circulation, and modify the quality of the blood, by the reduction of its red corpuscles, rendering it less irritating or exciting.

In *Hæmatemesis*, arising from gastritis, or vascular irritation, where the pulse is active and strong, venesection may be required, but is seldom called for. If practised, the pulse should be the guide to the quantity taken. Where there is too much

debility to admit of venesection, and inflammation or irritation are present, leeching the epigastrium may be substituted for general bleeding.

In *Melæna*, or intestinal hemorrhage, it is seldom necessary, but where this occurs in a plethoric habit of body, and an excited and strong pulse, it may be useful, either local or general. So in *Hemorrhoids*, accompanied by the same condition of the system as in *melæna*, it may also be resorted to. The local bleeding should be by leeches to the anus.

In *Hæmaturia*, where produced by local irritation, and not by remote causes, cups or leeches may be applied to the hypogastrium, loins, or perineum; or if not thus relieved, the lancet may be used.

In *Uterine Hemorrhage* of an active form, and especially if the system is plethoric, and the pulse full and strong, blood should be taken from the arm; and if symptoms of uterine congestion continue, local bleeding from surrounding parts may be necessary. But in the great majority of cases of uterine hemorrhage, the causes, and condition of the system, even in active hemorrhage, do not demand it; and in passive hemorrhage it should never be used.

I have thus given a brief view of the diseases of the organs of the circulation, and their contained fluid, in which bleeding is recommended by medical writers—though in my own practice I have judged it necessary in but a small minority of diseases of this character that have fallen to my care. There are but few diseases of this system in which depletion is not recommended, and from the function performed by it, and the immediate effect produced upon it, by the abstraction of blood, we might suppose the result would be prompt and decided upon them. Such is often, but not always the case; and if too freely or injudiciously resorted to, will frequently superinduce other diseases of more formidable characters than the one to be overcome. Such, for instance, is the case with phthisis, or anæmia. In constitutions predisposed to the former, the disease, which was latent, may be rendered active by the debility and impoverished state of the blood, produced by improper depletion; or the latter, by the impoverished condition of the blood, alone.

## ARTICLE XVIII.

## DEATH FROM TUBAL PREGNANCY.

By A. FISHER, M.D., Chicago, Ill.

Read to the Chicago Medical Society, March 23d, 1866

*May 31st, 1860.*—I was called to visit Mrs. B., aged 31, sanguine nervous temperament; has given birth to four children; has not menstruated for three months, consequently supposed to be between two and three months advanced in pregnancy. She complained of neuralgic pains in the back, which subsided in a few days under ordinary treatment.

*June 7th*, one week after, between 12 and 1 o'clock P.M., I was called in haste to see her again. She grew worse so fast, after they sent for me, that Dr. GROESBECK was called in to see her before I arrived, which was about 1 P.M., when I obtained the following history of the attack:—She was quite well the day previous, and on that day, until about 11 o'clock, when she was taken with severe pain in the bowels, with a desire to go to stool. Soon after, while in the water closet on the vessel, the pain increased and she was quite faint, so that she had to call for assistance to get in bed. Dr. G. said, when he first arrived, about half-an-hour previously, that she was very faint and much prostrated. He had given morphine and stimulants, and had applied cataplasms over the stomach and bowels. At that time, her pulse was 130, very weak and feeble; countenance pale and exsanguineous; extremities cool, and wet with perspiration; having a great and almost uncontrollable desire to get up and evacuate the bladder, which we dare not permit for fear of fatal syncope. The abdomen being somewhat distended, with no tympanitis, and the desire to urinate so great, that we introduced the catheter, to make it certain that the restlessness was not in a measure caused by distention of the bladder; but not a spoonful of urine was obtained. Tinc. opium, carbonate of ammonia, tinc. cantharides, brandy, &c., were freely administered, with very little effect. About 4 o'clock

P.M., Professor BYFORD saw her in consultation. He advised the continuation of stimulants, cataplasms, &c., as the only possible hope, but did not pretend to diagnose the case. All we could say, was that the symptoms were such as usually occur in internal hemorrhage, or rupture of some internal organ. She continued to sink, having the same desire to evacuate the bowels and bladder, with occasional cramps of the extremities, until about 7 o'clock P.M., when death ended her sufferings.

*Post mortem* examination was made the next day, by Professor BYFORD and myself. On laying open the abdomen, we found, in the peritoneal cavity, between four and five quarts of blood, which was about half coagulated. After removing it and sponging out the cavity, we found the left fallopian tube much enlarged and ruptured, containing a male foetus, about one and a-half inches in length. The only artery ruptured was not larger than an ordinary-sized knitting-needle. The uterus was slightly enlarged, but was not lined with the *membrana decidua*, as it sometimes is in tubal pregnancies. Every other organ in the abdominal cavity appeared perfectly normal.

This case I ought to have reported at the time of its occurrence, and intended to do so, but neglected it from time to time until it was almost forgotten. A few days since, I heard of a similar case, which reminded me of it, and I determined to report it at once.

I believe it is the duty of physicians, in such cases, or any case, of sudden death, where the cause is not perfectly evident, to propose and insist upon a *post mortem* examination, and report the case, for numerous reasons:—First, to exonerate the physician and attendants from all blame. Secondly, to quiet the minds of all with regard to the cause of death, showing by an examination, in many cases, that no remedies, however judiciously prescribed, could have saved the patient. Finally, by recording the symptoms and treatment of the case, and the appearances after death, we have additional facts to assist us in diagnosing similar cases.

Professor HODGE says, in his *System of Obstetrics*, that there seems to be limit to the development of the Fallopian tube, so

that rupture usually occurs in tubal pregnancies before the fifth month, and that the patient generally perishes from hemorrhage or inflammation. He further says, that M. HECKER has shown that the fatality in tubal pregnancies is about 63 to 1, or about 98½ per cent, while in primitive abdominal pregnancies, the fatality is 56 to 76, or nearly 42½ per cent.

Undoubtedly many women perish from hemorrhage or inflammation, occasioned by extra uterine pregnancies, without any suspicion of the cause, and if *post mortem* examinations were made, in every case, it would unquestionably reveal the fact that a much greater number of deaths occur from that cause than are shown by statistics, consequently it is impossible to ascertain the percentage of deaths from extra uterine pregnancy.

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### Selections.

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#### LECTURES ON THE RECENT ADVANCES OF OUR KNOWLEDGE IN THE DIAGNOSIS AND TREATMENT OF FUNCTIONAL NERVOUS AFFECTIONS.

By C. E. BROWN-SEQUARD, M.D., F.R.S., &c.

#### GENERAL REMARKS ON THE CAUSES, DIAGNOSIS, AND TREATMENT OF FUNCTIONAL NERVOUS AFFECTIONS.

GENTLEMEN:—The principal objects of these lectures are to point out the practical value of the great advances recently made in our knowledge of the normal and morbid states of the vital properties and functions of the various parts of the nervous system, and to show what progress we owe to experiments on animals, and to clinical researches on the therapeutic effects of many remedies, old and new. Before entering, however, into the study of our knowledge of the diagnosis and treatment of each type of the functional nervous affections, I propose to examine, in this lecture, some of the general principles of symptomatology, of diagnosis, and of treatment, in almost all the varieties of these affections.

One of the most important of the recent advances in physiology and pathology consists in the demonstration that the nerv-

ous conductors of the various kinds of sensitive impressions and of the reflex phenomena, and also for the transmission of nervous force to muscles, bloodvessels, etc., are absolutely distinct one from the others as regards their functions. Leaving aside the nerve-fibres of the brain, some of which have functions altogether different from those of other parts of the nervous system, I have ascertained that, besides the four distinct kinds of nerve-fibres of the higher senses, there are at least eleven distinct kinds of nerve-fibres in the spinal cord and in the cranial and other nerves. The following table shows what are the distinct functions of these eleven kinds of nerve-fibres.\* They are—

1st.	Conductors of impressions of touch.
2d.	“ “ tickling.
3d.	“ “ pain.
4th.	“ “ temperature.
5th.	“ “ contraction (muscular sense).

6th. Incito-motor conductors.

7th. Incito-nutritive and secretory conductors.

8th. Voluntary motor conductors.

9th. Involuntary motor conductors.

10th. Vaso-motor conductors.

11th. Nutritive and secretory conductors.

I hardly need to say that the number of distinct nerve-fibres is probably much greater than is shown by this table; but the demonstration of the distinction of other kinds of nerve-fibres (such as those serving to sensations of hunger, thirst, pressure, or to voluptuous sensations, etc.), is not yet sufficient.

Almost all the symptoms of functional (and I might say, also, of organic) nervous affections take place through one or other of three modes of alteration of the properties and functions of the fifteen kinds of conductors above named. Those three modes consist in: 1st, a diminution or loss of power; 2d, an

\* I have shown that the nerve-fibres serving to sensations of touch, of tickling, of pain, and of temperature, are not only completely distinct one from the others, but that, after having entered the spinal cord as parts of the posterior roots of the spinal nerves, and after a complete decussation between the fibres of the two sides of the body in that nervous centre, they form in it distinct groups or columns of conductors; so that an alteration, limited to a small part of the spinal cord, may strike either the column for touch, or that for tickling, or one of the other two kinds of conductors of sensitive impressions. I have shown, also, that the conductors for the muscular sense differ from the conductors just spoken of in this respect, that they do not decussate in the spinal cord, but that they form also a distinct column in each lateral half of that organ. (See *Journal de la Physiologie de l'Homme*, etc., No. 24, vol. vi., pp. 610-19 and 645.)

increase of power; 3rd, a morbid state producing a great variety of phenomena. In the nine kinds of conductors serving for the transmission of sensitive impressions the first of these three modes of alteration constitutes *anæsthesia*, the second *hyperæsthesia*, and the third is the cause of *morbid sensations* (including the so-called *referred sensations*).

I will not enter into details here about the kinds of nerve-fibres which I call incito-motor, incito-nutritive or secretory, or about those which I simply name nutritive or secretory; but as it would be impossible to understand the future lectures of this course without some knowledge of the properties and functions of these nerves, I will give, as briefly as possible, a few notions concerning their physiological and pathological history.

1st. *Incito-motor nerves*.—These are the well-known excitomotor nerves of Marshall Hall. A great many facts prove that they are absolutely distinct from the sensitive nerves. All the reflex movements of the muscles of organic or animal life (including the excretory ducts of glands, the bloodvessels, etc.) originate through an irritation transmitted by these incito-motor nerves.

2dly. *Nutritive and secretory nerves, and incito-nutritive and secretory nerves*.—That more appropriate names should be given to these nerves, I will not deny; but so long as their real mode of action remains somewhat doubtful, I think it is better to call them by names which only imply what we positively know of them—*i. e.*, that they are agents of modification of secretion and nutrition. The *secretory and nutritive nerves* are in many respects the antagonists of the *vaso-motor nerves*. While these last nerves, when put in action, produce a contraction of bloodvessels and all the phenomena which I have shown to ensue from that contraction (such as a diminution in the quantity of blood, a diminution of sensibility and other vital properties and of secretions),\* the nutritive and secretory nerves, on the contrary, when put in action, occasion a dilatation of bloodvessels and all the phenomena that ensue from it, as shown first by experiments of Czermak and of Cl. Bernard. I proposed long ago (in my lectures at the College of Surgeons in 1858)† an ex-

† See my Course of Lectures above quoted, p. 149.

planation of the action of these nerves, which becomes more and more probable with the frequent discovery of new facts concerning these nerves. The explanation is, that the secretory and nutritive nerve-fibres act upon the tissues so as to in-

\* See Course of Lectures on the Physiology and Pathology of the Central Nervous System, 1860, p. 142.

crease their chemical interchanges with the blood, and that, in consequence of this increase of chemical interchange, blood is more attracted to the part, and, as an effect of this greater afflux of blood, there is a dilatation of bloodvessels. In many of the future lectures I will mention phenomena due to this dilatation of bloodvessels from an irritation of this peculiar kind of nerves. I will only add now to what I have already said on this subject, that it is chiefly by a reflex action that these nerves produce their peculiar effects. The redness, the congestion of parts attacked with neuralgia or of neighboring parts, the secretion of tears when the eye is irritated or the skin of the face pinched, the secretion of mucous from the nose, or from laryngeal, tracheal or bronchial mucous membranes, or the diarrhoea produced by cold, and an immense number of facts in which there is a congestion or a secretion as a result of an irritation of cutaneous or other nerve fibres, are all effects of the peculiar influence exerted by secretory and nutritive nerve-fibres on glands and other tissues.

These nutritive and secretory nerve-fibres are, as I will try to prove in future lectures, the agents of production of inflammation, suppuration, and ulceration, by a reflex action. They are the channels of production of meningitis, of encephalitis or myelitis, when those inflammations are due to cold, to a burn, or to a visceral affection. They also have a great share in the production of many functional nervous affections, and particularly tetanus. Besides, through the agency of these nerves, much may be done for the treatment of nervous affections, as I will show hereafter.

The incito-secretory and nutritive nerve fibres are the incident or centripetal nerve fibres which, by a reflex influence, act upon the centrifugal secretory and nutritive nerve-fibres. Their distinct existence is not fully demonstrated, but many facts render it extremely probable.

The causes of functional nervous affections can be divided into several groups. 1st. An irritation by worms, by teething or decayed teeth, by cold, by a burn, a wound, an inflammation, a neuralgia, etc., of centripetal nerve-fibres (the incito-motor, the incito-nutritive, and some others). 2d. An alteration in the quantity or the quality of blood. 3d. Both the two preceding kinds of causes coëxisting together, as in cases of typhus fever, of variola, of diphtheria, of uræmia from disease of the kidneys, etc.

I will not now insist on the mode of action of these causes, as that will be better done in treating of each nervous affection

separately; but there are a few general remarks which will be in their proper place in this introductory lecture. There are two general rules which particularly deserve attention:—

1st. *The same peripheric cause of irritation acting on the same centripetal nerve may produce the greatest variety of effects, including every functional nervous affection or disorder.* This is well illustrated by the effects on the eye of a neuralgia of the infraor supra-orbitalis nerves. There are cases showing: 1st, spasm of the sphincter of the pupil; 2d, mydriasis; 3d, spasm of the orbicularis palpebræ; 4th, paralysis of the orbicularis; 5th, paralysis or spasm of one or several of the muscles of the ocular globe; 6th, photophobia; 7th, amblyopia or amaurosis; 8th, congestion or inflammation of the conjunctiva or of other parts of the eye; 9th, diminution or increase of the secretions of the lachrymal and other glands; 10th, a cataract; 11th, a glaucoma.

Other instances, though less striking, might be adduced. I will only mention what we know as regards the effects of cold air on persons coming out of a theatre. One may be attacked with a sore throat, a second with ophthalmia, a third with enteritis, a fourth with a nephritis, and many others with any other visceral inflammation; while one may be attacked with a facial paralysis, and others with almost every other partial paralysis, or with chorea, with contracture, with meningitis, or an inflammation of some part of the nervous centres. It is true that here it is not the same part of the skin which is acted upon by the sudden lowering of the temperature; in most of such cases, however, it is the front part of the chest and the neck that are subjected to the influence of the cold air.

It is probable that the great variety of phenomena following an irritation of centripetal nerve-fibres depends on differences of excitability of some parts of the nervous centres in different individuals. I have examined carefully, on a large number of men, the effects of tickling the sole of the foot, and found that these phenomena differed considerably on different individuals. In one, laughter predominated; in another, involuntary screaming, or shedding of tears, or jerks either in the irritated limb or in both lower limbs, or a general trembling, or a spasm of the diaphragm, or an almost tetanic rigidity of the irritated limb. I need not add that in some individuals there was hardly any effect produced when, being prepared for the irritation, they fought against its influence—a fact which, with many others, shows that by an effort of the will we sometimes can, at least in a certain measure, prevent the production of reflex phenomena.

I will not say more at present on this subject, leaving for other lectures the demonstration that it is through a real reflex action (*i.e.*, through a mechanism similar to that of reflex movements) that the morbid effects of an irritation of centripetal nerve-fibres take place.\*

2d. *The degree of excitability of the different parts of the nervous system may increase or decrease considerably in the same person under the influence of various causes.* This proposition is of so great an importance in the diagnosis and treatment of nervous affections, that it is only by the light it throws on many otherwise obscure cases that we are enabled to recognise their nature, and to apply the proper treatment. Many parts of the nervous system that are completely, or almost completely, inexcitable in a healthy condition, become excitable, and sometimes in a wonderful degree, under the influence of several morbid causes. Amongst these parts, I will point out the grey matter of the spinal cord, and the nerves of the tendons, aponeuroses, dura mater, periosteum, bowels, bladder, kidneys, and some other viscera. Many causes very different one from the other, may increase the excitability of the various parts of the nervous system. I will mention here only the principal of these causes: 1st. I have found that muscles, nerves, and the spinal cord, become more excitable when laid bare, and particularly when the air in contact with them is richer in oxygen than the ordinary atmospheric air.† 2d. A congestion or an inflammation will increase the excitability of nervous tissues everywhere, but nowhere so markedly as in the grey matter and some parts of the white columns of the spinal cord, which in consequence of that increase, will become able to produce referred sensations of pain, of cold or heat, of tickling, etc., and phenomena due to an irritation of motor, vaso-motor, and nutritive nerves. 3d. An afflux of blood, such as occurs merely by gravitation, or after a section or a paralysis of the sympathetic nerve, or a lesion of the spinal cord, the medulla oblongata, or the base of the brain, will also increase the excitability of peripheric nerves in the parts where this afflux takes place. 4th. Certain remedies or poisons (strychnine particularly) will increase the reflex excitability of the spinal cord to a wonderful degree; while others, such as atropine, chloroform. etc., will diminish it consider-

\* In one of the ensuing lectures I will explain why I do not admit the views so ably propounded by Prof. Lister and Dr. Handfield Jones on the so-called "inhibitory" nerves.

† See Proceedings of the Royal Society, vol. viii. 1857, p. 598; and Journal de la Physiol. de l'Homme, &c., vol. i. 1858, p. 617.

ably. 5th. Certain diseases, such as tetanus and hydrophobia, will increase extremely the reflex excitability of some parts of the cerebro-spinal axis. 6th. A great loss of blood, anæmia, chlorosis, will also increase the reflex excitability of the nervous centres.

The increase of reflex excitability in cases of extreme debility, as in old age, or after a loss of blood, or other causes of insufficient nutrition, would be very difficult to understand if we did not know that the reflex excitability of the spinal cord can be increased under the influence of certain substances (strychnine principally) when no blood at all remains in the bloodvessels of that nervous centre, as proved beyond the possibility of doubt by Messrs. Martin-Magron and Buisson. The excitability of sensitive nerves may also be increased when the quantity of blood is much diminished, as we often observe in fingers that have been exposed to cold air or cold water. It seems, from a review of all the facts I know bearing on this point, that certain substances contained in blood, altered in quantity or quality, will act on the excitability of nerve-fibres in the nervous centres, or in the nervous trunks and branches, so as either to increase it, as is done by strychnine (on the grey matter,) and oxygen (everywhere), or to decrease it, as is done by carbonic acid, atropine, chloroform, etc.

To conclude what I wish now to say on the excitability of the nerves, I will only mention—1st, that I have ascertained that the excitability of the same nerve varies in different parts of its length, and to such a degree that in some parts the excitability seems nil or is very slight, while in other parts it is considerable; 2d, that I have shown by positive experiments that the excitability of muscles, of nerves, and of the spinal cord, may be very much increased, while the *force* developed by the action of those parts is very small. For instance, atrophied muscles, unable to contract with half the force shown by healthy muscles, will, however, contract under the influence of an excitation that will produce no effect on healthy muscles.

I will say only a few more words on the causes of functional nervous affections. The important discussions between Virchow, Spiess, and others, on the share of the nervous system in the causation of the various morbid alterations of tissues and organs, have been very useful in bringing forward many interesting facts; but the exclusiveness of the two opposite schools, at the head of which are the eminent men I have just named, has thrown a great deal of obscurity on questions which, considered with less partiality, might have been solved easily. It

is certainly true, as maintained by Virchow,\* that nutrition and secretion, normal and abnormal, can be carried on without the intervention of the nervous system; but this does not at all prove that the nervous system cannot interfere, for good or for evil, in the nutrition and secretion in the various tissues and organs. For instance, there is no doubt whatever that an inflammation, followed or not by suppuration and ulceration, can take place without any intervention of the nervous system: but, as will be proved in one of the ensuing lectures, there is no doubt also that inflammations not only can be, but very frequently are, produced by a nervous agency. Indeed, facts are extremely numerous that establish clearly—1st, that normal nutrition and secretion do not depend essentially on any interference by the nervous system, and that all morbid changes in these fundamental organic functions can take place without any nervous influence; 2d, that the nervous system may, and almost constantly does, influence nutrition and secretion, and that it frequently produces, or helps to produce, a great variety of alterations of these two fundamental functions.

Not only can an excitation of the same nerve produce effects in the different parts of the nervous centres, in one or other of the viscera, or in distant nerves, or muscles, or bones, etc., but it can also produce, in the same part of the nervous centres, in the same viscus, in the same muscle, etc., different kinds of alteration. Why is there such a variety of alterations produced in one and the same part by an excitation which varies only in intensity? To answer this question I must go beyond the limits of the subject-matter of this course of lectures, and cast a glance on the mode of production of morbid affections of the various tissues and organs. Physiology, morbid anatomy, and clinical observation clearly point out that all nervous affections (organic and functional), as well as affections of any other part of the body, owe their production to three different causes.

1st. A special inherent tendency (inherited or not) of the elementary parts of the tissues to become altered in one or in another way.

2d. The production, or introduction in the blood, of those materials that are necessary for the formation of morbid growths, or able, like poisons, to cause alterations of nutrition or secretion.

3d. An influence of an excitation from outside, acting with or without the intervention of the nervous system, or a purely

\* See Dr. Chance's excellent translation of Virchow's "Cellular Pathology," Lect. XIV. London, 1860.

nervous influence starting from a peripheric or a central part of the nervous system.

If we keep in mind the truth that these three causes may exist together and in various degrees, we can easily understand how the same excitation of the same nerve may produce in the same distant part different kinds of alteration of nutrition. It is so that an irritation from a wounded nerve will produce either tetanus, or cholera, or catalepsy, or epilepsy, or delirium, etc., and by a reflex action on a peripheric part, muscular wasting or trembling, a contracture, a neuralgia, etc.

I now pass the diagnosis of functional nervous affections, on which subject I will only point out in parallel columns the principal distinctive features of these affections compared with organic nervous diseases.

*Characters of functional nervous affections.*

1st. The principal causes are: an alteration of the blood, and an irritation of a part of an incident or centripetal nerve, by a neuralgia, by worms, by teething or decayed teeth, by a wound, a burn, &c.

2d. Great variability in the intensity of the symptoms, and regular or irregular recurrence of attacks, with intervals of almost perfect health between these attacks.

3d. A sudden or rapid cure or improvement is not rare.

4th. Certain symptoms—such as a sensation of pricking, of formication, of burning heat, of icy cold, and other symptoms of irritation of conductors of sensitive impressions, and also alterations of nutrition and secretion of the skin and of mucous mem-

*Characters of organic nervous diseases.*

1st. One of the principal causes is a special tendency (inherited or not) to inflammation, to alterations of the bloodvessels, or to the formation of morbid growths.

2d. Persistence of the principal symptoms, with slow variations in their intensity.

3d. A sudden or almost sudden cure is impossible, and a rapid improvement is exceedingly rare.

4th. Most of the symptoms due to the irritation of conductors of sensitive impressions and of nutritive and secretory conductors, are extremely frequent in inflammation and even congestion of the nervous centres or their meninges, and they are not

branes and glands (bladder, kidneys, etc.) are extremely rare, except in a few of these affections (neuralgia, affections due to alterations of the blood, etc.).

5th. The temperature of affected parts generally low.

6th. The sphincters of the bladder and rectum usually normal.

7th. An aura, felt or unfelt, very frequently exists in some forms or periods of epilepsy, of hysteria, of catalepsy, of hydrophobia, etc.

8th. To remove the cause is an essential part of the treatment.

rare in many other organic nervous diseases.

5th. The temperature of affected parts generally high.

6th. The sphincters of the bladder and rectum often attacked with spasm or paralysis.

7th. An aura, felt or unfelt, exists only when the organic disease has caused a functional nervous affection.

8th. To remove the cause is often impossible, and, when possible, of less importance than the direct treatment of the structural alterations.

Other means of diagnosis between organic and functional nervous affections have been found within the last few years. As I shall have to speak of them at some length when I treat particularly of certain functional disorders, I will merely say here that the most interesting amongst them are—1st. The effects of pressure on nerves, as employed by Dr. A. C. Pinel, Dr. Aug. Waller, and Messrs. Bastien and Vulpian. 2d. The effects of tickling, and the degree and extent of reflex movements. 3d. The influence of galvanic applications. 4th. The effects of strychnine as a test for congestion in the spinal cord and its meninges. 5th. The existence of anæsthesia limited to a small spot. 6th. The alteration in the speed of transmission of sensitive impressions. 7th. The existence of an unfelt aura.

*Treatment of functional nervous affections.*—Great advances in the treatment of neuroses have been made within the last ten or fifteen years, particularly as regards a more rational or better appropriated employment of remedies and other modes of treatment than by the discovery of new remedies. I may say that I will speak of the rejection of certain modes of treatment, or of their limitation to fewer cases, as a real advance in therapeutics. I will divide this subject into eleven parts, as follows:—

I. Means of suppressing the causes, or of diminishing their intensity.

II. Means of diminishing the reflex excitability of the nervous centres.

III. Moral treatment.

IV. Special modes of treatment in periodical affections.

V. Treatment through irritations of the sensitive and other incident nerves.

VI. Physical and mechanical means of treatment.

VII. Complex modes of treatment, combining the two processes of irritation of incident nerves, and a modification of the blood.

VIII. Change of the composition of the blood, and elimination of morbid and other poisons.

IX. Special use of anæsthetics.

X. Treatment by remedies acting directly on the nervous system, or on the unstriated muscular fibres.

XI. Treatment by tonics and other remedies.

I. *Means of suppressing the causes, or of diminishing their intensity.*—When functional nervous affections are due to an evident irritation of a branch, or of the terminal ramifications of a nerve of a limb, or a superficial nerve of the abdomen or chest, several means of treatment may be successfully employed to check or to cut off the irritation. I will say a few words on the most important of these means.

1st. *Local applications of narcotics.*—In cases of epilepsy, of tetanus, of hysteria, and most other functional affections of the nervous system, a wound of the skin or of a branch of a nerve may be the cause of the nervous disorder. Narcotics, and particularly soluble salts of morphia and atropia, employed together, should be applied on the wound itself, in doses varied according to the absence or abundance of suppuration. An important rule of this mode of treatment, about which I will say much more in the lecture on tetanus, is that the application of narcotics must be frequently renewed, particularly if there is an abundant discharge of pus. If the cause of a functional nervous affection is a division of a large branch or of the trunk of a nerve, an injection of a solution of morphia and atropia should be made at some distance from the wound in the subcutaneous cellular tissue, round the central part of the divided nerve (half a grain of a salt of morphia with one-fiftieth of a grain of a salt of atropia).

2d. *Local application of ice.*—I have long ago pointed out the usefulness of this application on a wound producing a func-

tional nervous affection. I will only say here, that when such a means is employed, particularly in a case of tetanus, there should be no interruption in the presence of ice on the wound during the whole of the time that the nervous affection lasts. Billroth has recorded two cases in which tetanus due to a wound has appeared, notwithstanding the application of ice on the wound. It is probable that in these cases there had been some interruption in the application of ice.

3d. *Application of the actual cautery.*—This means, which may be useful when it is necessary to alter the nature of the secretions in a wound, or to destroy parts of tissues containing a venom, has not generally so much value as the preceding and the following modes of treatment.

4th. *Various applications on the trunk of nerves at some distance from a wound.*—It may be useful to lay bare the nerve that gives filaments to the wounded part, and to apply sulphuric ether or narcotic alkaloids or ice upon it. In cases in which there is reason to expect that the original wound will soon heal, this mode of treatment might prove useful.

5th. *Section of a nerve.*—The number of cases of epilepsy, of tetanus, and of other nervous complaints, due to a wound, a burn, etc., in which this mode of treatment has proved quite successful, is now so large that there is no doubt as regards its immense value. It is most important to know that the operation must be performed early, and that its chances of success decrease rapidly with the prolongation of the nervous affection produced by a wound, a burn, or some other peripheric cause of irritation. It is necessary not only to divide the nerve completely, but to take away a small part of its peripheric end, which is to be examined carefully with the microscope to ascertain whether it is altered or not. If it is found inflamed, or otherwise altered, the operation must be repeated (if possible, of course) on the same nerve, much nearer the spine or the cranium. The examination of a small part of the nerve extirpated in this second operation will prove important for the prognosis of the case. It can hardly be an objection against the division of a nerve in affections like epilepsy, tetanus, hydrophobia, etc., that a paralysis is the necessary result of the operation. No sane man can hesitate between these two things—an almost certain death, or the persistence of a most horrible affection which may produce imbecility; and a paralysis of motion and sensation in a part of a limb, or even in a whole limb. And the hesitation, if any could exist, would certainly give way to the knowledge that the ends of a divided nerve, even when a small

part has been excised, will often unite soon, or at least within a year, and the paralysis be cured more or less completely. The rapidity of union of the ends of a divided nerve may be so great that in a few weeks, and even sooner, there may be a partial return of function, as shown by cases reported by Mr. J. Paget, by Mr. Syme, and by Prof. Laugier. As regards the completeness of the return of the vital properties in a divided nerve, I have seen that it may be as perfect as possible, particularly in the case of a nobleman on whom Sir William Ferguson had divided the infra-orbitalis for a neuralgia.

6th. *Operations on the genital organs.*—An able surgeon has lately treated several kinds of functional nervous affections by the extirpation of the clitoris. That this operation may sometimes be useful, there is no doubt at all. But I cannot look upon this mode of treatment as one that should be employed in other cases than those in which a distinct aura starts from the clitoris, or in those cases in which that organ is morbidly sensitive and much hypertrophied. There are cases of nervous complaints, due to masturbation, in which the clitoris has been extirpated without any durable benefit as regards the nervous affection, or even as regards the masturbation. In women, as well as in men, the only decisive means against masturbation is the production of a small ulcer (by caustics or the red iron) on parts of the genital organs that are unavoidably touched or moved in the act of self-abuse, so that every attempt to accomplish the act, either with or without the help of the hand, is so painful that the patient must give it up. As regards the removal of the testicles, it seems to me a barbarous operation if performed only because there is an excessive tendency to sexual intercourse. I will say more on this point when I treat of epilepsy.

7th. *Trephining of the cranium.*—As a mode of treatment against epilepsy, this operation has been much more frequently performed than is generally known. It has also been performed, and successfully, in a case of tetanus, which I will mention in another lecture. It would be out of place here to discuss the question of the usefulness of that dangerous operation as a means of treatment of epilepsy. I will merely say that it is only in cases of an irritation of the dura mater, by a broken piece of bone, by diseased bone, or any other evident organic cause, that trephining can rationally be performed; and that even in such cases a cure might be obtained (and has really been sometimes obtained) by the use of counter-irritants on the diseased spot. In another lecture I will give the details of a

most interesting case published by Mr. Henry Lee (in Dr. Beale's *Archives of Medicine*, 1860, p. 80), in which trephining of cranium cured an ulcerous affection of the skin of the arm, and spasmodic movements in the same limb.

8th. *Ligature of the carotid artery.*—This most irrational mode of treatment is, or, I hope, will be, completely abandoned. It has been employed in epilepsy, and in mania, with the view that those affections depend on a congestion of the brain, and that a ligature round the carotid artery would diminish that congestion. I will show in the lectures on Epilepsy that the good effects of this operation in the cases of Preston and his imitators have been obtained chiefly through some injury to the cervical sympathetic nerve.

9th. *Other operations for the removal of causes of functional nervous affections.*—I will only point out the importance of the removal of a decayed tooth, of a tumor, of a carious or necrosed bone in those cases in which there is a probability that these sources of irritation are the principal causes of a nervous complaint. Of other operations, such as tracheotomy and the cauterization of the urethra, I will only say a few words. It is now perfectly established that the theory of epilepsy given by Marshall Hall was wrong; and that if tracheotomy may be useful in some cases of epileptic coma, of spasm of the glottis, in tetanus, in hydrophobia, or in whooping-cough, etc., this operation is then of service against an effect, and not against a cause, of the existing nervous affection. As regards the cauterization of the urethra, according to Lallemand's plan, in cases of nervous complaints due to seminal losses, I must say that I have been consulted by a great many patients who had been vainly submitted to that operation; while I have often observed a considerable amelioration, and sometimes a cure, by a medicinal and hygienic treatment, consisting in the use of atropine, the ergot of rye, large doses of the bromide of potassium, and tonics—such as quinine, iron, manganese, silver, with cold, shower, and sitz baths, gymnastic exercise, and the most nourishing alimentation.

10th. *Treatment against alterations of the blood, and visceral diseases*—I only wish to point out under this head that every organ or part of an organ, in so far as it has nerves, and also if it has any marked influence on the composition of the blood, can be the cause of a functional nervous affection. Therefore any alteration of any organ must be fought against in any such nervous affections, particularly when no other cause of it can be found but that alteration. As regards the morbid states of the

blood, there is no general rule of treatment that can be given. Anæmia, chlorosis, rheumatism, gout, and syphilis are to be treated in the same way when they are the causes of a nervous complaint as when they have produced no such effect.

II. *Means of diminishing the reflex excitability of the nervous centres.*—An increase of the reflex excitability of some part of the nervous centres, is one of the most important elements of many neuroses, and particularly epilepsy, hysteria, tetanus, hydrophobia, delirium tremens, chorea, paralysis agitans, and some forms of reflex insanity. To diminish that increase of reflex excitability is an essential part of the treatment in those affections. The following remedial agents are to be employed against this morbid excitability:—1st. Codeine, morphine, atropine, valerian aconite, the chloride of barium, and the bromide of potassium, are undoubtedly the most reliable remedies against an increased reflex excitability. According to the kind of nervous affection, and also to the seat of the increase of that vital property, we are to select one or several of these remedies. Atropine, valerian, and the bromide of potassium, are the most valuable in epilepsy; the chloride of barium is of real value against tetanus and paralysis agitans, but of no use in the common forms of epilepsy; codeine, morphine, and valerian are useful against hysteria, etc. None of these remedies, however, equals chloroform, but unfortunately its influence is merely transitory. Counter-irritants and the warm bath have also a great power against the increased reflex excitability, as I will show in another part of this lecture. 2d. As a morbidly increased excitability is very often due to anæmia, or to an impoverished nutrition, all the hygienic and medical means (good food, exercise, and tonics) that can improve nutrition, should be ordered in such cases against that morbid state. 3d. It is of the utmost importance to improve the sleep, which is generally so bad in patients attacked with a morbid increase of the reflex excitability. For this purpose an invaluable remedy has recently been discovered: it is the bromide of potassium. Excepting when pain is one of the causes preventing sleep (in which case opium, aconite, and belladonna should be employed together), I have found that this remedy has a most wonderful power to produce a quiet and refreshing sleep, without any drawback that I am aware of. I usually give to adults a dose of thirty grains of that salt a-quarter of an hour before the last meal, and a second dose of from thirty to fifty grains at bedtime. In cases in which, without any nervous complaint, there is sleeplessness owing to some cause of cerebral excitement, as

well as in all neuroses, excepting hydrophobia, tetanus, very severe cases of delirium tremens, and some forms of insanity, sleep is almost always induced by that remedy. In some cases I have found it necessary to increase the dose of the bromide, and to give also one grain or one grain and a-half of codeine an hour before bedtime. In those affections in which the bromide of potassium is not powerful enough as a sleep-inducing agent, a warm bath of four, five, or six hours' duration is often successful.

III. *Moral treatment.*—As I shall have to dwell at length on this subject when I treat of hysteria, I will only say a few words here on two general principles, which, notwithstanding their importance, are very much neglected. The first of these principles, so well established by the researches of Dr. Cerise, is that a *serious aim* is of the greatest value, and for many persons quite essential, to prevent or to check nervous disturbances. The applications of this principle are, of course, very difficult, and often impossible, in certain neuroses; but in those cases in which any kind of serious work, not too fatiguing or exciting, is liked by the patient, he should be induced to do it. In cases of hypochondria, of hysteria, of chorea, and even of epilepsy, a great benefit can be derived from a serious employment of the mental and physical activity of the sufferer. How often have I not seen young epileptics kept in idleness (alas! by medical advice), and, having gained more or less of the vices it leads to, improve rapidly from having their minds occupied at regular hours, in the same way as healthy people of their age. The second principle of which I will speak now is, that we must, in the interest of our nervous patients, much more than in our own, give the confidence and hope in the treatment we recommend. In hysterical and all nervous complaints allied with it, and also in hypochondria, and in several other neuroses, a great hope of cure will do much to work out the cure. No doubt you will say, How to give hope? I answer that the best means for that purpose is to have hope ourselves, and to express our hope with the accent of conviction. And as you would ask, How can we command hope in ourselves? I answer that the very knowledge of the truth of the principle I am now speaking of is enough to render one hopeful. I need not repeat that I am now speaking only of those neuroses in which the power of the mind upon the body is immense, and so much so that in some forms of these neuroses a sudden or almost sudden cure is not very rare.

IV. *Special modes of treatment in periodical nervous affections.*

—It is not my intention to speak now of the well known useful influence of sulphate of quinine against perfectly periodical attacks of neuralgia, of epilepsy, etc.; I only wish to speak of a method of perturbation of the nervous system which I have employed with great advantage in some of those cases of local convulsions, of attacks of epilepsy, of hysteria, etc., which either recur nearly at fixed periods, or are preceded by a warning that gives time to make use of the means I will now mention. In a case of spasm of some muscles of the jaw and face, preceded by a sensation of pricking in the cheek, and occurring several times a-day, in a boy seven years old, I found that violent exercise on a swing always prevented the fit when the patient had time to run to the swing before the muscular contraction had begun. By that means, which never failed, the boy was many hundred times saved from his attack before being completely cured of it, which occurred on the coming out of a molar tooth, which, however, had not given the least pain. The beneficial influence of this mode of perturbation of the nervous system I have observed since in a number of cases of hysteria and epilepsy. A great many other means of changing the state of the nervous system have been employed with some benefit by other physicians or by myself. Among these means I will merely mention here the following:—A ligature round one or several limbs (even when there is no evident aura) tied strongly and suddenly; a pretty sharp pinching of the skin; a rather large dose of an emetic taken with a great quantity of water; a cold shower-bath on the back; the application of an interrupted and powerful electro-magnetic current; a dose of twelve, fifteen, or eighteen grains of sulphate of quinine about an hour before the expected attack; an enema of a drastic medicine; the inhalation of chloroform, etc. I will give more details on these important perturbing means, in the lectures on hysteria, neuralgia, and epilepsy.

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#### ON THE INFLUENCE OF THE INGESTION OF COFFEE ON THE UREA AND CHLORIDES IN THE URINE.

By CHARLES E. SQUAREY, M.R.C.S., Resident Medical Officer to the  
London Fever Hospital.

(COMMUNICATED BY DR. GARROD.)

Observations were made on three cases whilst Mr. Squarey was residing at University College Hospital as physician's

assistant. The coffee was taken three times daily, at first in quarter ounce doses, and gradually increased till in the third case from four to six ounces were taken each day. The temperature in two of the cases was taken night and morning, and was never found to be above or below the limits of health. The urine was collected every morning at eight A.M., and examined the same day for urea and chlorides. Both analyses were made by Liebig's volumetric method.

#### UREA.

In the first case, the observations were carried on for six weeks. The patient's health was good the whole time, and he never complained of any uneasy sensation after taking the coffee. It was taken three times daily in quarter-ounce doses every alternate week. On comparing corresponding weeks of coffee and non-coffee taking, no appreciable difference is to be found. The greatest is in the first and second weeks. The daily average in the second week, when quarter-ounce doses of coffee were taken three times each day, was 2.198 grammes more than in the first week when no coffee was taken; in the third and fourth weeks the daily average was less by .424 of a gramme in the fourth week when coffee was taken; in the fifth and sixth weeks the daily average was less by .515 of a gramme in the sixth week when no coffee was taken.

In the second case, the observations, owing to an attack of tonsillitis supervening, and the patient leaving the hospital immediately on recovery, were only continued for one week, so that the influence of the coffee can only be judged of by comparing the amount of urea passed per kilogramme of body weight with the normal amount in health. The patient's age was 17 years; his weight was 115 lbs., or 52 kilogrammes; and he passed on the average .428 of a gramme of urea per kilogramme of body weight. He was taking half-ounce doses of coffee three times daily.

In the third case, the observations were carried on for ten weeks. On comparing the first and second weeks, it is found that the daily average was greater in the second, when three cups of a strong infusion of coffee were taken three times each day, by .381 of a gramme. On comparing the third and fourth weeks, a great diminution is found in the daily average of the latter, when quarter-ounce doses of coffee were taken three times daily; it was less by 5.099 grammes. Yet in the fifth week, when the same amount of coffee was taken, and in the seventh week, when half an ounce was taken twice a day, and in the

eighth week, when half an ounce was taken three times a day, the daily average was greater than in the sixth, when no coffee was taken; so that, although the daily average was lessened one week when quarter-ounce doses of coffee were taken, yet it did not rise when the coffee was left off, or become again diminished when the same and even larger doses were taken. The daily average in the ninth week, when from one and a-half to six ounces of coffee were taken each day, was less by 4.795 grammes than in the tenth week, when no coffee was taken; but in the tenth week, the patient not feeling well, the diet, which up to this time had been very strict, was varied, his health and appetite improved, and with it there was naturally a daily increase in the excretion of urea.

From these results, Mr. Squarey argues that coffee in the above doses certainly does not increase the excretion of urea, or diminish it to any appreciable extent; for he says that the slight difference that occurred in the daily average of the six consecutive weeks in the first case was by no means beyond the limits of health. That in the second case the amount of urea excreted per kilogramme of body weight was quite normal. That although in the third case there was the large diminution of five grammes in the daily average of the fourth week, when coffee was taken, yet this diminution did not recur when the same and even larger doses were taken; nor did the daily average rise when the coffee was left off, which it should have done had the decrease been entirely due to the influence of the coffee. That, according to Dr. Parkes, the decrease of five grammes in the daily average is not beyond the limits of health; for Dr. Parkes, in his book on the Urine, page 8, says that "the maximum and minimum amounts of urea passed on any one day by an individual are usually about one fifth above and below his mean amount;" so that in the third case, the patient passing on the average between thirty and thirty-five grammes, an increase or diminution of six grammes would be within the normal limits.

#### CHLORIDES.

In the first case, the daily average of the two weeks when coffee was taken in quarter-ounce doses was as nearly as possible the same as in the two corresponding weeks when no coffee was taken; the amount excreted per kilogramme of body weight being quite normal.

In the second case, half-ounce doses of coffee being taken three times daily, the amount of chlorides excreted per kilo-

gramme of body weight was  $\cdot 162$  of a gramme—a rather large, but certainly not abnormal proportion for a boy aged seventeen, and weighing 52 kilogrammes.

In the third case, the rate of excretion of the chlorides was high throughout the whole course of the observations, both during the coffee taking and the non-coffee taking weeks. The amount excreted per kilogramme of body weight was highest in the seventh week,  $272$  of a gramme, when half-ounce doses of coffee were taken twice daily; and lowest in the eighth week,  $\cdot 168$  of a gramme, when half-ounce doses were taken three times each day.

In conclusion, Mr. Squarey states that neither of the patients suffered in any way from ill effects from taking the coffee. There was never any giddiness, delirium, or unsteadiness of the hands. The patients invariably slept well.

The pulse, noted several times, was generally found to be increased for half an hour or so after taking the coffee.

The President spoke in terms of commendation of the large and patient observations in the author's paper. There were, however, several points in it on which further information was required. In the first place, it was necessary to know more exactly what kind of coffee was used—whether it was Plantation or Mocha, and whether, if it had been bought ground, it had not been adulterated. Again, the amount of exercise taken during the experiments would affect their results considerably. The effect of muscular activity in increasing the amount of urea was shown by its increase in chorea. Coffee would sometimes constipate, and at other would act as an aperient.

Dr. Webster said that what was often sold as coffee might scarcely be coffee, but chickory. His object, however, in rising, was to remark, with great submission, that he could scarcely understand the paper. This was not due to any fault in the Secretary's reading, but to using of French names for weights which required calculation. He had, he remarked, protested before against this, and still thought that English words ought to be used before an English society. He thought also the subject should be studied on a more extensive scale, and suggested to the author to inquire more widely into the effects of coffee-drinking. To do this, he had only to go across the Channel to France, and then to Spain, where no coffee was drunk, but only chocolate.—*London Lancet.*

## LECTURES ON CHOLERA.

BY PROF. ALONZO CLARK, M.D.

*Being a full synopsis of Lectures on Cholera, recently delivered at the College of Physicians and Surgeons, New York, and specially reported for the Philadelphia Medical and Surgical Reporter.*

## III.

## CAUSES AND NATURE OF CHOLERA.

The next point in the consideration of this disease is its cause, and the mode in which that cause acts upon the system, so as to produce the various phenomena which have already been noticed.

The literature of the subject abounds with a variety of theories of the manner in which the cause of cholera acts. One theory is, that the disease is zymotic in a certain degree, in other words, that after the introduction of the poison into the system, by a process of fermentation of some sort, a poison is produced like that which was at first introduced, if not in the body of the patient himself, yet in the excretions.

Another very prevalent theory is that there exists, during a cholera epidemic, and as its cause, a peculiar condition, the so-called *epidemic constitution* of the atmosphere, which is widely diffused, and acting as the general cause, brings on an outbreak of the disease whenever it meets certain local circumstances and causes the so-called *localizing conditions*.

Dr. Snow has another theory, according to which the disease is a communicable one, in a particular way: he claims that in the alimentary canal of the cholera-patient a poison is produced, which consists of something capable of being absorbed by, or floating in, water; that the water of wells and cisterns, during an epidemic, becomes impregnated by this poison and causes the spread of the disease; that a reason why the disease is so much more frequently communicated to nurses and attendants around the patient than to physicians, is because the former are less cleanly, and hence more frequently subject to introduction of this peculiar poison into the system.

In regard to this theory, certain things must be taken in consideration. Dr. Snow claims that the poison is generated in the alimentary canal, and carried by the evacuations and discharges from the stomach and bowels. Now, it is testified to by Schmidt, of Munich, that a man, in a state of intoxication,

drank a large beer-glassful of the vomit of a cholera-patient, without being followed by the first symptom of cholera, and physicians of Munich are said to have freely tasted and even swallowed the choleraic transudations without ill effects.

Again, a noticeable fact in the geographical course of cholera, is that it almost uniformly ascends rivers and streams; thus it ascended the Volga, Thames, Hudson, and the Mississippi. If the disease was propagated by the water contaminated by cholera dejections and evacuations, it is plain that it should descend in its course. In regard to some rivers, it may be objected that they are not resorted to for drinking and domestic purposes. But in others which are thus freely used, as for instance the Mississippi, the disease has always travelled up stream, not down.

Another theory, which, indeed, may be looked upon as but a modification of the former, is that adopted by several German physicians, which also considers a peculiar poison to result from the discharges of the patients, but not immediately. The cholera discharges, according to Thiersch, are not poisonous at first, but become so, after the lapse of some time, by decomposition and fermentation under an elevation of temperature of at least 50° Fahrenheit. According to facts brought forward in support of this theory, this fermentation which develops the poison in the discharges ceases in about eight days, and then they become inert.

The chief evidence upon which Thiersch bases his opinion, is that he fed a number of mice on fresh cholera discharges, and a number on cholera material which had undergone fermentation. The animals fed on the first remained perfectly well, while those that had been living on the fermented discharges were killed by it, under symptoms resembling cholera, diarrhœa taking place before death, and *post mortem* appearances being analagous to those in man. Animals which were fed on old cholera evacuations, after fermentation had ceased, suffered as little as the first.

The logical conclusion, if this theory be true, is that means of disinfecting the evacuations of cholera-patients by means of chloride of lime, sulphuric acid, etc., constitute a chief and important element of prophylaxis. In support of this, it is stated that there are two prisons in the neighborhood of Munich; in one, very strict and energetic measures were adopted, during the prevalence of the disease, to disinfect the discharges of all the prisoners and inmates, and the result was that only one case occurred among five hundred inmates; in the other insti-

tution, in which no means whatever were adopted of disinfecting the discharges, 15 per cent of the inmates were attacked.

The evidence in regard to this theory is not yet conclusive; still it deserves attention, and should remain open for further investigation.

Another theory which has been advanced, is that the influence of *ozone*, negative or positive, in the atmosphere, is connected with the causation of the disease. There are many quite opposite opinions regarding this theory, and the influence of the presence or absence of ozone in abnormal quantity. Dr. Peters, of Lexington, Ky., during the prevalence of a cholera epidemic, instituted investigations as to this point, and, according to his statements, not much change in the ozonic condition of the air could be observed; if there was any change, it was unimportant. The most recent observations, probably, on this subject, are those of Dr. W. B. Richardson, of England. Some of his conclusions as to the facts at present known respecting ozone are stated as follows:—It is always present in the air, naturally in the proportion of about 1 part in 10,000; it is rapidly destroyed in large towns, crowded, close, and filthy localities; ozone gives to oxygen its life-supporting properties; its effects are destroyed by great heat; diffused minutely through the air, it produces on inhalation distinct symptoms of acute catarrh. When animals are subjected for a long period to ozone in small proportions, the agent acts differently in different animals; carnivora die, after some hours, from disorganization of the blood, while herbivora will live for weeks and suffer from no acute disease. Science has not yet actually *demonstrated* that the presence of ozone in the air can produce actual disease, though the facts approach to demonstration that catarrh is thus produced. During periods of intense heat of weather, the ozone loses its active power. Ozone acts rapidly upon putrefactive organic matter, breaking up the ammoniacal products of decomposition, and hastening organic destruction. In a negative condition of air, *i. e.*, the absence of ozone, the purification of the organic matter is greatly modified, and the offensive products are increased; wounds become unhealthy and heal slowly in such negative air, and though there is no demonstrative evidence that any diseases are actually caused by this negative condition, the inference is fair that diseases which show a putrefactive tendency are influenced injuriously by a negative condition of the oxygen of the air. It is also probable that, during this state, decomposing organic poisonous matters become more injurious. And, finally, as ozone is used up in crowded locali-

ties, and as it is essential that ozone should be constantly supplied, in order to sustain the removal of decomposing substances and their products, no mere attention to ventilation and other measures can be fully effective, unless the air introduced be made active by ozone. Fever hospitals and other large buildings in towns should be artificially fed with ozonized air.

All, however, that is positively known regarding ozone, in the present state of science, is a bare probability that if it exists in certain quantities, it may purify the air. As to its causal connection with cholera, nothing is positively known.

*Electricity*, too, has been charged with being the cause of cholera; at least, it has been claimed that its presence or absence has something to do with its production. A French observer has made a statement that he observed, during the prevalence of cholera, that he could not obtain sparks as usual from an electrical apparatus, and in England, it is said to have been noticed that, during a cholera epidemic, a large horseshoe magnet attracted and held suspended much larger quantities of iron than ordinarily, and that, as cholera abated and ceased, its attractive power diminished also.

These and similar observations, however, do not bear sufficient weight to justify any decided conclusions.

Leaving the question as to the influence of ozone, still another theory has been proposed by Dr. Mitchell, who finds the cause of cholera to be a *fungus* or fungoid spores, developed in the earth or in the atmosphere, and introduced into the system by the respiration. In another branch of this theory, the origin and growth of the fungus is placed into the body itself. This theory received a special importance when Drs. Brittain and Swain announced that they had found in the drinking water of London the *cholera fungi*, which were minutely described. At Edinburgh, however, these fungi could not be detected with the microscope, neither in the drinking water nor in the dejections of the patients. Dr. Parker, the microscopical anatomist of the London Hospital states that fungi of various sorts are not unfrequently found in the intestinal canal of animals and man, but that they are perfectly inert. The strongest reason, however, for discrediting this statement is in the result of the investigations of a committee appointed by the College of Physicians of England, who examined into the matter. They reported that the *rings*, which were described as forming part of the cholera fungi by Swain, were found to be remnants of onions, turnips, and other vegetables; the *oval cells*, also claimed as part of the cholera fungi, were ordinary spores

of the rust of wheat or corn, such as are frequently found in bread; and the *disk*, also part of the supposed cholera fungus, had a similar origin. So, on the whole, this idea comes to nought, as well as Dr. Snow's theory, unless further and stronger evidence is produced.

Another view is, that it is produced in a manner similar to yellow fever. This theory claims that there are certain wide-spread conditions, atmospheric or terrestrial, which produce a certain predisposition; and that added to these a special miasm is produced, external to ourselves; a certain poison is liberated in the air, unknown in its nature, intangible, known only by its effects, which will reproduce itself, and so render a whole town infected. This we know of yellow fever, which is not an indigenous disease, but can be kept off by rigid quarantine and strict sanitary rule. In just this way it seems cholera is produced—by a special poison, a malaria, the production of certain general wide-spread conditions and local influences, but not reproduced in the system.

All these various theories agree in one point, namely, that *there is a poison* which gives rise to the disease, and this is a fact which cannot be disbelieved.

How this poison is introduced into the body cannot be confidently answered. We might assume that it is absorbed through the surface of the skin, the lungs, or the alimentary canal, etc. But, in one way or another, it is introduced, enters the blood, and circulates through the system.

Introduced into the system, the poison of cholera soon begins to act upon the *ganglionic nervous system*. It is true, the examinations made after death, of the centres and nerves of the ganglionic system have not led to constant appearances; and, indeed, they are not found to have undergone marked changes, except occasional softening and enlargement. But still this is the best hypothesis which we can present, as to the manner in which the poison of cholera acts upon the system, and that we can find no decided anatomical lesions, is no real excuse for not accepting it. A thousand changes are produced and observed in the innervation of the organs and tissues of the body, characterized by the most marked phenomena, without our being able to discover any physical appearances in the nerve structure, which would account for them. Certain medicinal substances appear to have specific affinities in their action, to different parts of the nervous system; strychnia, for instance, upon the spinal system, opium upon the brain. Now in a case of strychnia-poisoning you observe the most fearful commotion

of all the muscles controlled by the spinal axis, resulting in death. Still, if you search after death for any marked anatomical lesions in the spinal cord or nerves, none will be found. Thus, again, in a person dead from an overdose of opium, though congestion may be found in the vessels and meninges of the brain, the most careful examination will not discover any microscopical changes in the brain-cells or the minute structure of the organ. Thus certain agents, indisputably, exert a powerful action upon various parts of the nervous system, with no accompanying special lesion that can be observed; we might run through the whole of the medicinal articles acting upon the nerves to illustrate this point.

While, then, the absences of pathological evidences after death forms no objection to this hypothesis, there are certain analogies which speak strongly in its favor. The branches or filaments of the sympathetic nerve, which go to the eye, govern and regulate the circulation of that organ; if they are divided or disordered, you observe hyperæmia, ecchymosis, and a series of changes, which finally lead to ulceration and destruction of the organ. So the ganglionic system everywhere, but more particularly in the alimentary canal, governs and regulates capillary circulation. The poison of cholera begins to act upon the ganglionic system, partially paralyzing it, and gradually increasing in its effects during the period of diarrhœa. The blood flows into these vessels in unusual tides, giving rise to hyperæmia more or less intense, and from which the copious discharges are derived; this goes on until the blood, by the constant drain of its fluid constituents becomes markedly and seriously changed; then follows the disturbance in the spinal system, the cramps and convulsions, which, it is probable, are entirely reflex. The hyperæmia at first does not manifest a tendency which it afterwards shows; but, as it continues, much as in the eye after division of the branches of the sympathetic nerve, assumes an inflammatory character, for we cannot, on looking at the *post mortem* appearances, avoid the conclusion that there is inflammatory-hyperæmia, or even a certain degree of inflammation. There is, however, no organizable, plastic deposit. The material thrown out, as described in a former lecture, is something like the exudation of diphtheria; and, it may be added here, that this infiltration of granular matter into the intestinal mucous membrane and glands, seems to be almost characteristic of the disease.

Dr. Horner, as early as 1832, noticed and described the detachment and denutment of epithelium, and sloughing of portions

of the mucous membrane; and he believed the disease to be inflammatory. Pirogoff, too, says that the cholera appearances have great analogy to inflammation.

In summing up the evidence regarding the cause and nature of cholera; it may be stated, then, that there is a poison, the exact nature of which is not yet perfectly understood; that this poison, introduced into the system, causes disturbances of innervation, or a sort of paralysis of the ganglionic nervous system; that this leads to extensive hyperæmia of the alimentary canal, resulting in the symptoms described, and to the reflex phenomena alluded to, and as the disease progresses, obtaining more or less an inflammatory character.—*Phil. Med. & Surg. Reporter.*

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### MEDICINAL USES OF PTELEA TRIFOLIATA.

By O. F. POTTER, M.D., St. Louis, Mo.

I wish to call the attention of physicians to a plant, the medicinal virtues of which I have been familiar with for some years, and from personal experience would recommend it to the favorable notice of the profession.

The plant is known as the ptelea trifoliata, or, commonly, as the wafer-ash or wingseed, a species of so-called swamp dogwood, and is of the natural order Xanthoxylacæ.

It is a shrub of from six to eight feet in height. The leaves are trifoliate and marked with pellucid dots. The leaflets are sessile, ovate, short, acuminate, downy beneath, lateral ones inequilateral, terminal ones cunate at base, from three to four inches long by one to one and three-fourths inches wide. The flowers are polygamous, nearly one-half inch in diameter, of a greenish-white color, and of a disagreeable odor. Stamens mostly four with style short; fruit, a two-celled samara, nearly an inch in diameter, winged all round, nearly orbicular. It flowers in June. It is common to this country, growing more abundantly west of the Alleghanies, in shady, moist, and rocky places generally at the edge of woods. The bark of the root possesses its peculiar medicinal properties, which it yields to boiling water, but alcohol is its best solvent. The bark, when dried, is of a light brownish-yellow color, comes in cylindrical rolls of quills a line or two in thickness, and from one to several inches in length; is irregularly wrinkled externally, and is covered with a thin epidermis; internally it is of a yellowish-

white, but becomes darker on exposure. It has a peculiar, rather aromatic smell, and a bitter, pungent, and rather acrid taste, yet nothing disagreeable; the pungency is persistent, which is owing to the oil which it contains.

I have been using it as a tonic to follow the use of quinine in all grades of fevers, also in cases of general debility connected with gastro-enteric irritation. It is mild, unirritating, having a soothing influence on the stomach, promoting digestion. It promotes the appetite, enabling the stomach to endure suitable nourishment, and favors the early re-establishment of the digestive functions, and will be tolerated by the stomach when almost all other tonic or stimulant remedies are rejected. I have found it especially useful in cases of debility following a low grade of fever, also with females after confinement, or where the menstrual functions are deranged, frequently by sustaining the digestive and secretive functions, regulating the menstrual flow; also, as a sustaining and strengthening stimulant in debility connected with or following wasting ulcers or scrofulous sores.

I have been in the habit of using it in the form of a tincture, made by putting six ounces of the bark and one-half ounce of ginger to two quarts of whisky; the dose from one to two table-spoonsful three times a day for an adult.

I feel assured, from over ten years' experience in using it, that it will be found a most valuable and reliable remedy. It has been used occasionally by the so-called eclectic physicians, and also by the negroes of the South, who call it the scrofula root, from its usefulness in sustaining the system when debilitated by that so common disease amongst them. The old French inhabitants near St. Louis also used it many years ago as a cure for the intermittent fevers of the country, long before quinine was known. When used for a great length of time, or in very large doses, it occasionally, in some persons, occasions an erysipelatous inflammation in the surface, which, however, only lasts for a short time if its use is persevered in, and no ill effects follow it.—*N. Y. Med. Jour.*, Dec., 1865.—*St. Louis Medical Reporter*.

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ASIATIC CHOLERA IN VIRGINIA.—It is a noteworthy and astonishing fact that, during the forty years in which this scourge has afflicted the earth, no case of Asiatic cholera has ever occurred in the basin of country embracing the mineral springs of Virginia.—*London Lancet*.

## Proceedings of Societies.

### CHICAGO ACADEMY OF SCIENCES.—TRICHINÆ.

The following report, presented to a recent meeting of the Academy of Sciences, will be read with interest and profit. The character of the Committee is a full guarantee of the reliability of the facts presented in the Report. Let all who continue to eat pork be certain that it has been thoroughly cooked.  
—[Ed.]

Your Committee appointed at the last regular meeting to examine into the facts concerning the supposed existence of trichinæ in pork raised in this country, and the liability to disease which it may occasion, have the honor to make the following report:—

In preface it is proper to state that no reliable observations have ever yet been made in this country, with the view of deciding the question of the occurrence of trichinæ in our pork. Their existence here has been repeatedly denied, but the denial has never been based upon sufficient research. Your Committee became aware at the outset that the task imposed upon them was one far too arduous for their unassisted labors. The importance of the subject and the magnitude of the interests involved, indicated the necessity of an investigation of the most thorough character, and the propriety of accumulating the results of a large number of observations in order that the conclusions should be based upon data of such extent and variety that all causes of error might be eliminated.

To this end we have availed ourselves of the permission granted us at the time of the appointment of the Committee, and have added to the original number our colleague, Dr. HOMER A. JOHNSON. We have also been fortunate in securing the aid of a number of professional gentlemen residing in our city, who have relieved us of much of the labor connected with the very extensive series of microscopic examinations of pork, necessary to the attainment of reliable and definite results. To

these gentlemen, Drs. HOLLISTER, JEWELL, SHERMAN, NICKERSON, HAY, LYMAN, and NASON, we beg leave here to offer our acknowledgments for the assistance rendered.

*Its Character and History.*—Before presenting the results of our observations it may not be out of place to give a brief sketch of the character and history of the little helminth which is justly causing so much excitement among consumers of pork, a kind of animal food which is probably more extensively employed and more generally useful, not to say indispensable, than any other. Our own studies upon the structure and migrations of this helminth have indeed developed nothing new; but they have been sufficient to satisfy us of the accuracy of the most recent observations of the German naturalists, LEUCKART, and VIRCHOW in particular, who have devoted their attention to the subject. *Trichina spiralis* has been known for 30 years as an endo-parasite in the muscles of man, which could be bred in the muscles of some other mammals by feeding them with it. More recently it has been discovered to occur naturally in the muscles of swine. It is a minute, slender, and nearly transparent nematoid worm, scarcely 1-20th of an inch in length, even in its adult state, with a bluntly rounded posterior end, and an attenuated anterior extremity, at the tip of which the mouth is situated. Its internal structure, even when fully developed, is very simple. There is a straight alimentary canal, the œsophagial portion of which is enveloped in a glandular sheath; a yellowish globular organ at the middle, and a generative sac, nearly filling the posterior half of the body. In the encysted state in which the worm is most commonly observed, the latter organs are not fully developed.

*History of the Trichina.*—The life history of the trichina has been ascertained to be as follows:—

It is introduced in its encysted state into the stomach of man, or some other mammal, which may be susceptible to its ravages, and which may feed upon flesh infested with it. Very shortly the worms are freed from their capsules by the action of the digestive fluid and range freely in the stomach and intestines of the custodian. Their development proceeds rapidly and pro-

creation takes place within four or five days after their ingestion. The males bear to the females the proportion of one-tenth only. The females are ovo-viviparous, each giving birth to from 60 to 100 young and dying shortly thereafter. The young are extremely minute and thread-like, and remain for a short time lurking in the mucus of the lining membrane of the alimentary canal, where they cause great intestinal irritation, diarrhoea, and even death, if present in sufficient numbers. During the purging, many of the young trichinæ are swept from the intestinal canal with the fecal matters, in which they probably remain for some time alive, and it is supposed that swine sometimes derive their parasites from this source. After reaching a proper degree of size and strength, the young trichinæ begin to penetrate the walls of the intestines, and make their way toward their proper home, the voluntary muscles. They are now found in the glands of the mesentery and in the serous cavities. When numerous they cause great disorders in their passage and the animal infested, which has survived the previous intestinal irritation and its consequences, may now succumb from peritoneal inflammation.

*The Migratory State.*—In the course of their migration the trichinæ gradually assume the cork-screw form. They first reach the muscles immediately surrounding or traversing the cavity of the body, such as the diaphragm, lumbar, pharyngeal, intercostal, and abdominal muscles. Many doubtless take up therein their permanent abode, but it has been observed that they have a tendency, especially when very numerous, to push toward the extremities, or to pass between the ribs into the spinal muscles. This tendency to wide distribution is also shown in the fact that they are found more abundantly in the distal extremity of each muscle,—that farthest from the intestinal tract, in which situation their migration appears to have been stopped by the impervious tendon. In traversing the muscles, as far as has been observed, they do not penetrate the fibres, but wind their way between them. During this operation they cause in the affected man or animal great muscular pains and soreness, cramps, and even tetanic symptoms.

The migration of the young trichinae occupies about four weeks. We have now traced them up to the point at which they become encysted. Of the causes which guide them in each individual case in the selection of their hibernaculum,—why some should encyst themselves close to the intestinal canal, while others proceed even to the extremities of the body, we know but little. It is probable, however, that this depends upon their supply of food and degree of development, and, that, after a proper condition is reached, a slight obstacle may arrest their course and cause them to encyst. Thus we have found them in every instance most abundant, not in the centre of masses of pure fibre, but in the immediate vicinity of some such obstacle as tendon, adipose tissue, or even the investing membrane (connecting tissue) of the fasciculi. It is the muscular fibre only that they affect, none having ever been found encysted in fat or the other tissues.

*The Encysted State.*—Having arrived at the terminus of its migration, the worm perforates the wall of the fibre selected, passes into it and flattens or tightens its coil in order to accommodate itself to the circumscribed space. Even then, however, the coil is so much larger than the diameter of the fibre as to dilate it at the point to two or three times its natural width. Immediately around its coil the trichina secretes a delicate membranous sac, and the enlarged cavity of the fibre becomes filled with a granular detritus, which is itself shortly enclosed by the action of the vital forces of the muscle, in a second envelope, the whole forming the fusiform cyst. This cyst gradually becomes calcareous by secretions from the surrounding parts and in time may become sufficiently cretified to be apparent from its whiteness to the naked eye. But it is only in man that these *calcareous* cysts have been observed,—hogs being generally killed long before time is afforded for the accumulation of sufficient lime. When the trichinae have all become encysted, the acute pains usually cease in the subject. The amount of inconvenience afterwards experienced depends entirely upon the number of the fibres rendered inert by the presence of the parasites. This number is often sufficiently great to produce par-

tial paralysis. Cases have occurred for instance, in which the use of the fingers has been entirely lost while other members retained their power. The parasites have a tendency to crowd into certain parts and leave others unaffected.

*The Torpid State.*—The trichina has now reached its quiescent or torpid state, in which it must remain during the life of its custodian, unless dislodged by accident. It feeds no longer, yet its development goes slowly on, until it has reached the condition of puberty. From this time it must remain unaltered, awaiting the chances of its freedom, dependant upon the ingestion of the flesh containing it by some animal carnivorously inclined. Then the cycle goes on as already detailed. These helminths can breed but once in the body of one and the same animal.

*Origin of the Trichina.*—With regard to the origin of the trichina little or nothing is known. It has been thus far found to occur naturally only in man, the hog, and the cat. All statements of its natural occurrence in other mammals seem to have been founded on error, although some of them may be easily infested by special feeding. Above all, reports of its occurrence in earth-worms and other cold-blooded animals are to be entirely discredited. These latter are indeed infested with tilaria, and other nematoid worms, somewhat resembling trichinae; but the practised zoologist easily distinguishes between them. The occurrence of trichinae in man and in the cat is easily accounted for,—both have probably eaten of infested pork. But how shall we account for the existence of the worm in the hog? We can scarcely account for all cases of trichiasis in these animals upon the supposition that they have eaten of the flesh of man, cats, or of other hogs, although the small proportion of hogs infested might lend some color of probability to this supposition. The question remains for further investigation.

*Period of Existence.*—As before mentioned, trichinae have been known for 30 years to exist in the muscles of man. But it is only within a very few years that their deadly character, when introduced into the system in considerable numbers, has been fully understood, and has attracted the attention of the

medical profession. The terrible catastrophies of Hedersleben and Hettstadt, at the former of which 100 and at the latter 83 persons were the victims of a meal of trichinous pork, with many minor disasters, have not failed to excite in Europe the deepest interest and the most careful study of the ravages of the flesh worm. To such an extent, in fact, have these disasters alarmed the people that in many parts of Europe no pork is allowed to be sold without having previously undergone microscopic examination.

*Tenacity of Life.*—The deadly character of the trichinæ depends upon their great tenacity of life. Total decomposition of the muscle containing them will not effect their vitality, and, in cooking, their destruction can only be accomplished by the application of a heat above 150 degrees Fahrenheit.

*Analysis.*—Your Committee have conceived that the object for which they were appointed is twofold:—first, to ascertain whether trichinæ actually exists in the hogs of this country and in those of the northwest in particular; and, secondly, should they exist, to determine the extent of the danger thereby incurred, and to ascertain the best means of averting it. For the attainment of the first-mentioned object they have, with the assistance of the gentlemen named at the head of this report, procured and examined portions of muscle taken from 1,394 hogs in the different packing houses and butcher stalls of our city. The results of these examinations have been engrossed in the tables herewith presented. The first of these shows the number of specimens, and in most cases the names of the muscles examined by each observer, with the number of trichinous specimens found by each. The second gives various data concerning the 28 trichinous specimens found, which are numbered in the order of their discovery, and are preserved in the cabinet of the academy:—

Observer.	Pharyngeals.	Diaphragm.	Abdominals.	Intercostals.	Lumbers.	Spinals.	Various.	Total.	Trichinous specimens.
Dr. Johnson -----	1	7	---	---	15	224	74	321	13
Dr. Sherman -----	17	9	30	37	---	35	2	130	2
Dr. Nickerson -----	---	---	10	9	---	107	124	250	3
Dr. Jewell -----	---	---	---	---	---	---	212	212	3
Dr. Hollister -----	---	---	---	---	---	---	70	70	2
Dr. Nelson -----	---	---	---	---	---	---	50	50	1
Drs. Blaney & Hay -----	4	9	8	---	---	10	3	34	---
Dr. Nason -----	---	---	9	7	---	31	---	47	---
Dr. Andrews -----	---	---	---	---	---	---	96	96	1
Dr. Lyman -----	---	---	---	---	---	---	90	90	1
Dr. Stimpson -----	6	8	---	---	16	61	3	94	2
Total -----	---	---	---	---	---	---	---	1394	28

No.	Observer.	Muscle.	No. to a cubic in.
1.	Dr. Johnson-----	Spinal-----	350
2.	Dr. Johnson-----	Spinal-----	300
3.	Dr. Johnson-----	Spinal-----	200
4.	Dr. Johnson-----	Intercostal-----	100
5.	Dr. Johnson-----	Intercostal-----	500
6.	Dr. Johnson-----	Spinal-----	600
7.	Dr. Johnson-----	Abdominal-----	3,000
8.	Dr. Johnson-----	Spinal-----	500
9.	Dr. Johnson-----	Spinal-----	1,000
10.	Dr. Stimpson-----	Spinal-----	18,000
11.	Dr. Johnson-----	Spinal-----	15,000
12.	Dr. Johnson-----	Spinal-----	300
13.	Dr. Johnson-----	Spinal-----	300
14.	Dr. Johnson-----	Spinal-----	300
15.	Dr. Stimpson-----	Spinal-----	400
16.	Dr. Nickerson-----	Unknown-----	48
17.	Dr. Nickerson-----	Unknown-----	80
18.	Dr. Nickerson-----	Unknown-----	192
19.	Dr. Sherman-----	Unknown-----	3,000
20.	Dr. Sherman-----	Pharyngeal-----	6,000
21.	Dr. Andrews-----	Abdominal-----	2,000
22.	Dr. Nelson-----	Spinal-----	2,000
23.	Dr. Lyman-----	Unknown-----	16,000
24.	Dr. Hollister-----	Unknown-----	500
25.	Dr. Hollister-----	Unknown-----	500

26.	Dr. Jewell-----	Unknown-----	2,000
27.	Dr. Jewell-----	Unknown-----	250
28.	Dr. Jewell-----	Unknown-----	500

*The Proportion of Diseased Hogs.*—By these tables it will be perceived that we have found trichinæ in the muscles of 28 hogs out of the 1,394 examined. We may therefore conclude that in the hogs brought to Chicago 1 in 50 is affected with trichiniasis in a greater or less degree. We must confess our surprise at arriving at this result, which indicates with little doubt the startling fact that trichiniasis in pork is even more common in this country than in Germany, where it has caused so much suffering and death. For instance, in the city of Brunswick, where a most careful inspection of 19,747 hogs was made in the years 1864-5, only two were found to contain trichinæ in their muscles, the proportion being 1-10,000 against 1-50, as before stated in our country.

*Our Immunity.*—The comparative immunity from the disease which our own people have enjoyed, undoubtedly results from the habit of cooking meat before eating it, while in Germany it is eaten raw by the poorer classes on account of the high price of fuel.

*Variation in Number.*—It will be also observed by consulting the tables that the specimens examined show great variation in the number of worms infesting them. We have given, indeed, only an approximation to the number existing in a cubic inch in each specimen of muscle, but this approximation is sufficiently near the truth for our present purposes. Our method has been to count the trichinæ occurring in several different portions of muscle, each a cubic tenth of an inch in size, and to multiply the average number by 1,000, to find the number to a cubic inch. By this method we find that only three of our specimens (Nos. 10, 11, and 23) contain over 10,000 to the cubic inch and are therefore as densely infested with the worm as the pork which has occasioned the disasters in Germany. The remaining 25 are infested in a comparatively slight degree, viz.:—from 48 to 6,000 to the cubic inch. The specimen most thickly infested contains 18,000 to the cubic inch, and we have calcu-

lated that a person eating an ordinary meal of this pork in a raw state would speedily become a victim to the ravages of not less than 1,000,000 of young trichinæ. In certain cases of death from trichiniasis, the number found in the muscles of man has been 2,000,000.

With regard to the muscles of the hog most liable to be infested, we have to state that our determinations do not accord with those of European observers, inasmuch as more than half of our trichinous specimens have been taken from the spinal muscles. In Europe the microscopic inspectors of pork are directed to examine nine different sets of muscles, viz.:—Those of the diaphragm, tenderloin, shoulder, front and back of neck, intercostals, extensors of fore-arm, flexors of the leg and the muscles of the larynx. In this list the spinal muscles are not even mentioned, although their examination with us has proved the most prolific in results, even after making allowance for the fact that we have searched these muscles more than any others. Our experience has led us to believe that a much smaller number of examinations than are required by the European rules will suffice for the detection of trichinæ in dangerous numbers in pork. The occurrence of a number so small as to escape observation, in a search of two or three of the muscles most liable to be infested, we do not conceive to be dangerous when we consider that the greater proportion of the worms must be killed even by the ordinary method of cooking.

*Defence against its Ravages.*—Now that the existence of trichinæ in our pork has been established beyond a doubt, it will be proper for us to point out all known means of defence against its ravages.

First, with regard to the rearing of hogs. These animals undoubtedly become infested through the eating of flesh of some kind, since no trichinæ nor germs of trichinæ have ever been found in any vegetable food. A strict attention to the feeding of hogs and their confinement in pens where no animal food is accessible in an infallible preventive against trichiniasis in them. Such management is all the more necessary, since European authorities agree that it is impossible to diagnose the disease in

the animal from external appearances, and no culpability can therefore attach to the farmer for selling hogs which prove to be affected with trichinæ.

In regard to pork, the origin of which is doubtful, the use of the microscope is primarily indicated. With this instrument only can we ascertain with certainty whether the muscles of the hog are free from the parasite. The general use of this instrument is, however, impracticable, unless a system of microscopic inspection be adopted here as in Europe at the great packing establishments. But we have in our power much more simple means of insuring safety in the consumption of pork. It is simply necessary to cook it thoroughly so that every portion of the meat shall have experienced a temperature of at least 160 degrees Fahrenheit. We cannot insist too strongly on this point. Again by properly salting and smoking the meat for at least ten days, the trichinæ should they exist, will certainly be killed. Simple dessication of the meat, if continued for a period of sufficient length, will also kill them. They will never be found alive in old hams, for instance. On the other hand, mere pickling appears to have very little effect upon these worms.

*Existence before Discovery.*—Trichinæ have doubtless always existed in the muscles of the hog, although probably not to the same extent as at present, and trichiniasis in man may have existed to a considerable extent in this country before its nature and cause became known. Some of the members of your Committee can recall cases of obscure diseases which have come to their knowledge in past years, which may have been owing to the presence of trichinæ.

*Economical Aspects.*—Having now fully exposed the exact extent of the danger from trichinous pork, to which our people are liable, and stated the means of avoiding it, we will proceed to close our report with a few remarks upon the economical aspects of the subject. A panic has been produced in the mind of our public by the news which has reached us from Germany concerning the disasters which have occasionally followed the consumption of pork in a raw state. The excitement has, with

little doubt, been fostered by interested persons, for speculative purposes, until people have come to imagine there is a danger in eating pork of any kind,—a danger all the more terrible because hidden, little understood, and undiscoverable by ordinary means. All this excitement has occurred, before a single instance of the occurrence of trichinæ in American hogs has been, as far as we are aware, authentically reported. It has therefore become necessary that the subject should be thoroughly investigated, in order that the people, by familiarity of the danger and confidence in their understanding of its character, may not be the pray of superstitious fears. The panic which now prevails is unfounded in reason, senseless, and greatly injurious. We do not allude to the commercial aspects of the question, a matter of small moment compared with the great importance of pork as the kind of meat diet upon which nine-tenths of our agricultural population, north and south, mainly depend. In our view it would be folly to discard this kind of meat from our list of articles of food, when all possibility of injury attending its use may be avoided by the most simple means. Let the people but understand that only 1 hog in 48 contains trichinæ at all, that only 1 in 300 contains them in sufficient numbers to cause considerable danger, and that even in these cases the worms are rendered innocuous by proper smoking, drying, or cooking,—and we imagine that few sensible persons will refuse pork as food if it suits their convenience to use it.

(Signed)

E. ANDREWS, M.D.,

J. V. Z. BLANEY, M.D.,

HOSMER A. JOHNSON, M.D.,

WILLIAM STIMPSON, M.D.,

*Secretary.*

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#### PROCEEDINGS OF THE DEWITT COUNTY MEDICAL SOCIETY.

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The Society met in Annual Session, in Clinton, at the office of Dr. Shurtleff, on Monday, the 2d day of April, 1866, Dr. Tyler in the Chair.

The minutes of the previous meeting were read and approved.

On motion of Dr. Madden, Dr. Drombolone and Dr. Jno. A. Edmiston were invited to participate in the proceedings of the meeting.

The election of officers being in order, the following gentlemen were elected for the ensuing year:—

*President*—Dr. John Wright.

*Vice-President*—Dr. B. K. Shurtleff.

*Secretary*—Dr. C. Goodbrake.

*Censors*—Dr. J. H. Tyler, Dr. R. T. Richards, and Dr. T. W. Davis.

*Delegates to the Illinois State Medical Society*—Dr. R. T. Richards, Dr. B. K. Shurtleff, and Dr. T. W. Davis.

*Delegates to the American Medical Association*—Dr. B. S. Lewis and Dr. T. K. Edmiston.

Dr. Tyler, the retiring President, then delivered an address on the diseases most prevalent in DeWitt County during the past year, for which he received the thanks of the Society.

Dr. John A. Edmiston, of Clinton, and Dr. Charles W. Drombolone, of Marion, having been proposed for membership, and the Censors having reported favorably, they were unanimously elected members of the Society.

Dr. Z. H. Madden reported a case of intermittent fever, followed by partial paralysis, which called up a discussion, in which most of the members present participated.

The essayists appointed at the last meeting, having failed to fulfil their duty, were continued, and the President appointed Drs. J. A. Edmiston and C. W. Drombolone to read each an essay at the next meeting.

Cholera was chosen as the subject for discussion at the next meeting.

On motion, it was

*Resolved*, That in view of the probable visitation of cholera, this Society earnestly recommend that the Board of Trustees of the Town of Clinton take the necessary steps to remove all filth and garbage from the public square, streets, and alleys of said town, and that it pass an ordinance compelling the citizens to remove from their premises all offal, manure, and other kinds

of filth; and, so far as possible, to whitewash all unpainted fences and outhouses; also to apply freely of lime to sinks, sewers, and privies; and that the carrying out of the same measures be recommended to the citizens of the several unincorporated towns in the County.

On motion, the Secretary was ordered to furnish copies of these proceedings to the *Chicago Medical Examiner*, *Clinton Public*, and *Chicago Medical Journal* for publication.

On motion, the Society adjourned, to meet in Quarterly Session at Clinton, on the first Monday of July next, at 10 o'clock A.M., at Dr. Shurtleff's office.

C. GOODBRAKE, *Secretary*.

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### Editorial.

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#### CONVENTION OF REPRESENTATIVES FROM MEDICAL COLLEGES OF THE WEST.

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In response to a call of the Faculty of the Ohio Medical College for a meeting of delegates from the Medical Colleges of the West, for the purpose of agreeing upon a more uniform rate of lecture fees, the several delegates assembled in the faculty-room of the Ohio Medical College, in Cincinnati, at 10 o'clock A.M., of April 24th, 1866.

The meeting was called to order by Prof. M. B. Wright, of Cincinnati, who, after briefly stating the objects for which the meeting had been called, moved that Prof. N. S. Davis, of Chicago, be Chairman of the Convention. The motion was carried unanimously, and Prof. Davis took the Chair.

On motion of Prof. Mendenhall, of Cincinnati, Prof. Gustav C. G. Weber, of Cleveland, was appointed Secretary.

The members present, were as follows:—

M. B. Wright, from the Medical College of Ohio.

Geo. Mendenhall, from the Miami Medical College.

N. S. Davis, from the Chicago Medical College.

Francis Carter, from the Starling Medical College.

Gustav C. G. Weber, from the Charity Hospital Med. Col.  
S. H. Douglas, from the Med. Dep't of University of Mich.  
T. M. Holloway, from the Medical Department of University  
of Louisville.

Prof. Wright presented letters from the Deans of the St. Louis Medical College, the Nashville University, and the Medical Department of the Iowa University, expressing a concurrence in the object of the meeting, and an assurance that the schools they represented would sanction such uniform and advanced rate of fees as should be agreed upon by the Convention. The colleges not represented either by delegates or letters were, Rush Medical College, at Chicago; Cleveland Medical College, at Cleveland; Cincinnati College of Medicine and Surgery, at Cincinnati; Medical Department of Humboldt University, at St. Louis; and the Kentucky School of Medicine, at Louisville.

To elicit the wishes of the Convention, Prof. Wright offered a resolution declaring that the sum of \$105 should be adopted as a uniform rate of lecture fees by the Medical Colleges in the West. A very free and pleasant interchange of views followed, in which all the members participated, and during which it was made apparent that the immediate adoption of such a standard was impracticable, mainly on account of the peculiar position of the Medical Department of the University of Michigan.

After a recess for dinner, the Convention re-assembled at 4 o'clock P.M., when Prof. Davis offered the following preamble and resolutions, as a substitute for the resolution offered by Prof. Wright. The latter accepted the proposition, and after another free interchange of views in relation to the whole subject of Medical College organizations, as well as fees, they were unanimously adopted, as follows:—

*Whereas*, the cause of medical education requires the establishment and maintenance of permanent colleges, with all the necessary means for illustration and practical instruction, as well as competent teachers, thereby involving a large annual expenditure of money, therefore,

1st, *Resolved*, That a reasonable demand for lecture fees is

required by the best interests both of the colleges and those who patronize them.

2d, *Resolved*, That competition among Medical Colleges, to be beneficial to the profession and the cause of medical science, should be based *entirely* on the ability of those engaged as teachers, and the completeness of their curriculum, with the facilities for practical demonstrations accompanying it, and not on *mere pecuniary* differences in the cost of attendance; and, hence, the fees charged in all the Medical Colleges, in a given section of country, should be uniform, or so near uniform that the actual cost of attendance in the different colleges shall be practically equal.

3d, *Resolved*, That inasmuch as only a limited number of students can be properly accommodated or educated in any one college each year, any State which, with enlightened liberality, should so endow the medical department of its State University as to make education therein free, ought to so far regard the interests of the institutions of other States, as to limit the freedom of its instruction to the citizens of its own State.

4th, *Resolved*, That in the opinion of the college faculties here represented, the aggregate annual fees for instruction in each college should be not less than \$105 for each student.

5th, *Resolved*, That a committee of three be appointed, to communicate the foregoing views to the faculties of the several medical colleges not here represented, and also to the Regents of the University of Michigan, with a view to the ultimate removal of such obstacles, legal or otherwise, as may be in the way of the voluntary adoption of the sum named in the 4th resolution, or some other sum near it, as a uniform standard of college fees; and to take such measures as they may deem necessary, and report to a future Convention called for that purpose.

6th, *Resolved*, That the colleges here represented would, in the opinion of the delegates present, be willing to lengthen their annual lecture terms to six months, if, by so doing, practical uniformity in the standard of fees could be fully secured.

On motion of Prof. Holloway, the Secretary was authorized to furnish a synopsis of the proceedings of this Convention to

the different medical journals of the country for publication.

On motion of Prof. Carter, Professors M. B. Wright, of Cincinnati, T. M. Holloway, of Louisville, and N. S. Davis, of Chicago, were appointed the committee called for by the 5th resolution.

Prof. Carter also moved, that when this Convention adjourn, it be to such time and place as the committee just named may deem proper; which motion was adopted.

On motion of Prof. Holloway, the Convention then adj'd.

The meeting was certainly a very pleasant one; the discussions throughout were cordial, friendly, and sincere; and we think it constitutes the beginning of a movement which, if followed up in the same spirit, will lead to the speedy adoption of several measures of great importance, both to the Colleges and the profession at large.

[For the information of students interested in knowing the price of lecture tickets during the coming winter, we would state that the contemplated advance can only take place after *all the Western colleges* have agreed to it, and that such an agreement cannot, by any possibility, be arrived at under a year or two. There will, therefore, be no rise in the prices next winter, except, perhaps, in a few schools whose rates are now below the average. E. A.]

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TRICHINA.—The aversion to pork, produced by the agitation of the subject of trichiniasis, has induced the Chicago Academy of Sciences to appoint a committee to investigate the subject, with a view to ascertain the exact state of facts, in order that the public may know whether the trichina exists in this region or not, and if it does, whether the consumers of pork can, in any way, be assured of safety in the use of this important staple. The present state of uncertainty in the public mind is injurious to various interests.

The committee commenced by obtaining specimens of muscle from about 1300 different hogs, from all parts of the West, fed in various ways, and raised in all sorts of circumstances. These specimens were distributed among eight of the best microscop-

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pists of this city, for examination. The result showed that trichina, beyond all doubt, exists here, and probably has existed through all time wherever hogs have lived. Among the 1300 animals, 28 were found to contain the parasite, which is rather more than 1 animal in 50, or 2 per cent. Of these, only 3 or 4 contained them in dangerous quantities. The committee reports that the statement that trichinæ can endure a boiling heat without death, is false and absurd. By actual experiment, they are found to be always killed by a temperature of 150° Fah. It is proved, also, that salting and smoking for 10 days is fatal to them. A case of trichiniasis is reported at Detroit, Mich., in the *Medical Review*, in which a woman, lately arrived from Germany, died, having eaten the parasites before her arrival here. Two cases were also reported in the *Buffalo Medical Journal*, two or three years since, but with the exception of these three, the committee cannot learn of any deaths clearly traceable to trichiniasis in this country. In Germany, where so many deaths have occurred, the poor people have a habit of eating a large amount of raw pork, in which state the parasite is taken alive into the stomach of the patient; but in this country, pork is universally well cooked, even by the most indigent. This accounts for the fact, that though trichinæ are doubtless as ancient and universally distributed as the hogs themselves, and Americans have always made pork a very prominent article of diet, yet the disease is almost unknown this side of the water.

The conclusion is, that pork in a raw state, or not thoroughly cooked, is a dangerous food; but, when well cooked to the centre, is as absolutely safe as any other article of diet. It is proper to add, that trichinæ are found in a variety of animals besides swine, and that the same rule, as to thorough cooking, ought to be applied to all, whether fish, flesh, or fowl. Not only is trichina found widely distributed, but also the germ of the tapeworm may be found in a variety of the animals used for food. Beef and mutton are, probably, more free from parasitic dangers than any of the meats in common use.

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**CHOLERA.** The cholera in New York is said to be still confined to Quarantine. In Halifax, the Health Officer, Dr. SLAXTER, is reported to have died of cholera, contracted while in attendance on the cholera-patients quarantined from the steamer England. The daily papers have telegrams, stating that the disease is raging at Key West, Florida, and give rumors of deaths from it in Washington and Cincinnati. On the whole, the appearances indicate that the disease is likely to pay another series of visits to all our chief towns. It behooves all, therefore, to be ready, and to instruct the public in all those hygienic measures adapted to limit the ravages of the prospective epidemic.

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**ILLINOIS STATE MEDICAL SOCIETY.**—The next Annual Meeting of this Society will be held in *Decatur*, on the first Tuesday in June next. All local Medical Societies in the State are entitled to one delegate for every *five* resident members; every Medical College to two delegates; and every Public Hospital to one delegate.

N. S. DAVIS, *Permanent Sec'y.*

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**NOTICE TO SUBSCRIBERS.**—During the past few weeks, we have been sending *receipts* to all of our subscribers who have paid up to the end of this year in advance, and *bills*, showing the balance due, on all who have not so paid. We wish to get the books settled, and have every one of our patrons know the exact condition of his account. If any discover mistakes in the bills they receive, we hope they will promptly inform us, and we will take great pleasure in making all needed corrections.

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**BOOKS RECEIVED.**—We have received the following new works:—

A MANUAL OF THE PRINCIPLES OF SURGERY, BASED ON PATHOLOGY. FOR STUDENTS. By WILLIAM CANNIFF, Licentiate of the Medical Board of Upper Canada, etc., etc., etc. Philadelphia: LINDSAY & BLAKISTON. 1866. Price \$4.50.

DIARRHŒA AND CHOLERA; THEIR ORIGIN, CAUSE, AND CURE BY MEANS OF ICE. By JOHN CHAPMAN, M.D., etc., etc.

For sale by S. C. GRIGGS & Co., Lake St. Price 25 cents.

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